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SENATE...... ......No. 40.

THIRD ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH

OF

MASSACHUSETTS.

JANUARY, 1872.

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GEORGE DERBY, of Boston, *Secretary.*

JAN 23 1940

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Commonwealth of Massachusetts.

Boston, January 22, 1872.

Hon. Horace H. Coolidge, *President of the Senate of Massachusetts.*

Sir:—I have the honor to present to the Legislature, the Third Annual Report of the Massachusetts State Board of Health.

Very respectfully,
Your obedient servant,

GEORGE DERBY,
Secretary of the State Board of Health.

GENERAL REPORT OF THE BOARD.

To the Honorable the Senate and the House of Representatives of Massachusetts.

We herewith present to the legislature the third annual report of the State Board of Health. We find reason to be glad that so much has already been accomplished through the direct and indirect influence which the Board has been able to exert.

We trust that the papers now submitted will commend themselves to the legislature; and we are specially desirous that the use which has been made of the executive power placed in our hands by the Act of April 8, 1871, may be approved; and that thus the same moral and material aid which has been given us in the past may be continued in the future.

Doings under the Law concerning Slaughter-houses, and Noxious and Offensive Trades.

A detailed account is herewith submitted of the various hearings and decisions of the Board under this statute. It will be seen that we have been called to consider some of the worst nuisances in the Commonwealth. The meetings summoned to hear these cases have been at times very laborious and irksome to the members of the Board.

It is to be hoped that less of this duty will hereafter be required, and this seems probable inasmuch as the nuisances at Brighton will ere long disappear.

The following is a list of the cases brought before the Board under the law of April 8, 1871, with the decision in each case:

1. William H. Dow of Boston. Bone-boiling. (Ordered to "cease and desist.")
2. Smith Adams of Lowell. Slaughtering and bone-boiling. (Ordered to discontinue certain processes.)

3. George A. Sawyer of Watertown. Slaughtering. (Ordered to discontinue certain processes.)
4. Terence McGovern of Lawrence. Bone-boiling. (Ordered to discontinue certain processes.)
5. E. & C. Rice of Brighton. Depot for blood, collected from slaughter-houses. (Ordered to discontinue).
6. Augustus Wietz of Brighton. Slaughtering. (Ordered to "cease and desist.")
7. Christopher Frischner of Brighton. Slaughtering. (Ordered to "cease and desist.")
8. J. S. Mead of Milford. Bone-boiling. (Ordered to "cease and desist.")
9. J. W. & G. W. Hollis of Brighton. Slaughtering. (Ordered to "cease and desist.")
10. North, Meriam & Co. of East Cambridge.
11. J. P. Squires & Co. of East Cambridge.
12. Joseph Boynton of East Cambridge.

(Complaints against the above hog-slaughtering establishments were made by the health authorities of Cambridge and Somerville. At the time appointed for a "hearing" they were withdrawn by the complainants.)

13. L. F. Merrill of Somerville. Fat-rendering. (Ordered to "cease and desist.")
14. Aaron Gundenhuyzer of Brighton. Slaughtering. (Ordered to "cease and desist.")
15. Nahum Ward & Co., of Boston. Bone-boiling. (Ordered to "cease and desist.")
16. Charles Sanderson of Brighton. Slaughtering. (Ordered to "cease and desist.")
17. John Dupee of Brighton. Slaughtering. (Ordered to "cease and desist.")
18. Jeremiah Pratt of Brighton. Slaughtering. (This case was heard on the 21st October, but no decision was made.)
19. Augustus Wietz of Brighton. Slaughtering. This refers to a new place occupied by the defendant after another place had been ordered to be closed by the Board. (Ordered to "cease and desist.")
20. Sebastian Wietz of Brighton. Slaughtering. At the time appointed for a "hearing" the complainants failed to appear.
21. Upton & Ames of Brighton. Bone-boiling. (Ordered to "cease and desist.")

23. City of Charlestown. Storage of Swill at Almshouse. (Ordered to be discontinued during the months of June, July, August and September.)

A hearing on a second complaint against N. Ward & Co. has been postponed at the request of the counsel for complainants.

This disposes of every case brought before the Board, except one, which was expressed so indefinitely that the Board declined to receive it and notified the complainants of their objection to its form.

Many of the orders above referred to have been complied with. It is, however, known to the Board that in some instances they have been disregarded. In view of this fact, and in consequence of certain applications made to the Board for the enforcement of their orders through appeal to the supreme court as provided in the statute, at a meeting of the Board, October 21st, 1871, the following vote was passed:—

"Whereas certain parties against whom complaints have been made for carrying on noxious and offensive trades, have, upon due notice and hearing before this Board been ordered to desist and cease from further carrying on said trades; but, as the Board are informed, said parties have disregarded said orders. And the attorney-general upon request made to him by the Secretary of the Board having said that he could not in consequence of pressing official duties aid in the enforcement of said orders by applying to the supreme judicial court, and the Board having as they believe no authority to employ counsel to appear before said court for the purpose of procuring injunctions as contemplated by the statute of 1871, chapter 167; therefore,

Voted, That the Secretary be directed to notify the complainants in the cases referred to, or their attorneys, so that they may make the necessary application to the supreme judicial court for the abatement of the nuisances of which they complain; and that the Secretary be directed to furnish such complainants or their attorneys with every facility in his power to enable them to make such application effectual."

In one case only (that of E. & C. Rice of Brighton) has application for the enforcement of our order reached the supreme court, and it was at once granted. Other cases in which our orders were disregarded are in the hands of the complainant's counsel, to whom in accordance with the vote of the Board above referred to, certified copies of our action have been delivered.

The Brighton Butchers, and the Proposed Abattoir.

In our last report we were compelled to say that the project of building an abattoir was prevented by the steady opposition of the prominent butchers. We are happy now to state that this opposition has ceased; that land has been bought, and that plans are now being made for the erection of buildings in which all portions of the slaughtered animals can be converted into useful materials on the spot. Ample structures for these most important purposes will soon be erected along the borders of Charles River. The probable result will be that Brighton, one of the most beautiful of the towns adjacent to Boston, instead of being a nuisance to itself and to all travellers through its borders, will be rid of all those things which now make it offensive. It will be observed that by the Act of incorporation of the Butchers' Slaughtering and Melting Association, this Board is ordered to see not only that the buildings are properly arranged, but is also required to prescribe rules for the future guidance of all who carry on their trade within the enclosure. Under this law, proper inspection will prevent the entrance of any dead or diseased animal, or the exit of any flesh unfit for food. It is obvious that these regulations, together with the fact that this Board has a right to direct all engaged in slaughtering within six miles of the State House to transact their business at the abattoir if it is found to be a nuisance elsewhere, will be a tower of defence for Boston and its vicinity against the sale of unwholesome meats. The meat of the Brighton abattoir will be preferred by all prudent consumers.

Slaughtering, Bone-Boiling, and Fat-Melting.

(By the SECRETARY.)

The Board desires to call attention to a special report by the Secretary, in which may be found a detailed and connected history of the operation of the law of April 8th with reference to such general reform in the manner of conducting these trades as will make them no longer "noxious and offensive."

The Board ever since its first establishment has had this question fully before it as one of great importance.

The Evil Effects of Arsenic in Certain Green Colors.

(By Dr. Frank W. Draper.)

This paper is of great interest, and will be found to have many useful applications. It should be read by ladies who choose green as a color for the walls of their drawing-rooms, or for their dresses, or who wish to wear bright green flower leaves as ornaments. Guardians of children should beware of green-painted toys. The green-paper covers of Boston confectionery are sometimes deadly. Green lamp-shades are to be suspected. All that is needed to protect the community from these dangers is such knowledge of the subject as is given in this report.

Mill-Dams and Water Obstructions.

(By the Secretary.)

The hygienic effect of the building of dams is usually wholly ignored by capitalists and legislators. We here see the danger to life of proceeding thus blindly. Here are facts sufficient to convince any unprejudiced mind that consumption and malarious fevers are thus aroused. Epidemics flourish near such water obstructions. Great nuisances are thus created in various places cited in this report. It will be seen that the industrial and hygienic questions are inseparably joined, and it will be well that our legislature should so regard them when mill-dams are thought necessary to aid capital in its honorable endeavor to turn our various water-courses to the benefit of man.

Alcoholic Drinks—Their Use and Abuse—Analysis of the Information Derived from Correspondence throughout the Globe.

(By the Chairman.)

The Board submits to the legislature this paper prepared with care and labor by the Chairman of the Board.

It is a more thorough analysis of the correspondence published last year than could be made at that time. The Board presents it as a valuable contribution to the discussion of the general subject of the use and effect of intoxicating drinks, but without expressing, as a Board, any opinion concerning the inferences made by the writer, or on the special methods advocated by him.

The idea of bringing intemperance under cosmic law, and of graphically representing that fact, the Board believe is brought out in this paper for the first time in the history of the subject.

The Board heartily commend the proposition for the establishment of inebriate asylums for the restoration to health of dipsomaniacs.

Adulteration of Food.

(By Mr. Henry B. Hill.)

It is the hope of the Board to be able to investigate the quality of food in its various forms as offered for sale in Massachusetts. The inquiry by Mr. Hill concerning canned-fruits, vinegar and coffee, is a contribution to this general design.

As regards fruits, it would appear from the specimens examined that although traces of metal were found in the cans, their amount was exceedingly small. It is to be remembered, however, that the solder contains a large proportion of lead, which may be readily dissolved in case the fruit undergoes acid fermentation—a thing not unlikely to happen.

It is also evident that care should be used in sealing the cans that the solder does not drop within.

Vinegar is found to be sometimes fortified with sulphuric acid, which no one would like to have mingled with his food. It also appears that lead faucets are not infrequently used in vinegar barrels—a practice full of danger, as will appear by reference to our report of last year on poisoning by lead.

Coffee bought in bulk was found to be really what it purported to be, while so called coffee put up in pound parcels was largely made up of pease and beans, and in one specimen contained no coffee at all. These facts the Board believe are worthy of consideration by every householder.

Proper Provision for the Insane.

(By Dr. Edward Jarvis.)

Dr. Jarvis has contributed a valuable paper with reference to the classification of insane people. He urges the necessity of variation in the character of the architecture of asylums to meet the various classes of patients, and of erecting buildings in future more in accordance with modern opinions in this regard. No restraint, except what is absolutely needful, should be put upon the unfortunate inmates of these establishments. At present our asylums have too much of the general aspect of common jails. The Board commends this report to the consideration of those who may be charged with the building of hospitals for the insane.

The Use and Abuse of Opium.

(By Dr. F. E. Oliver)

There has been an enormous increase in the importations of opium during the past quarter of a century, and it behooves us to discover, if we can, what use is made of it. It will be seen that the habit of opium-eating has not infrequently had its origin in the prescriptions of physicians, who have given it for the relief of pain. Also, that various nostrums much used among children contain large amounts of this drug. Reform from the opium-eating habit is found to be even more difficult than from the intemperate use of alcohol. The reports respecting both opium and alcohol in the present volume will be found to present facts of great importance. In view of the similarity of the conclusions reached by the authors of these papers, it is proper to say that each was entirely ignorant of the other's investigations.

Effects on Health of the Use of Sewing Machines Moved by Foot-Power.

(By Dr. Arthur H. Nichols.)

This is a very complete statement of the subject, and is based on personal investigation, and on returns from a large number of correspondents.

It proves that various ailments are caused by sewing machines moved by the feet. It is evident that most women cannot make continuous use of the common pedal for any considerable time without suffering from general feebleness, and also locally about the pelvis. These evils may be prevented by

1st. The substitution of steam for foot-power in large establishments.

2d. By the use of electro-magnetic power ; or, 3d. By the use of improved pedals, which greatly reduce the required movements of the feet and legs of the operator.

The information contained in this report deserves careful consideration by every one interested either by personal use of the machine, or by superintendence of the labor of others.

Vegetable Parasites and the Diseases caused by their Growth on Man.

(By Dr. James C. White.)

This paper is a thoroughly scientific and elaborate statement of the whole subject of vegetable parasites which appear on the exterior of man. As such it is submitted by the Board to the medical profession, in confidence that they will find it of great value.

But the remarks the author makes on chignons may interest women; while those on barbers-itch will suggest important cautions to every man who shaves save at his own home. Any one who allows his beard to be cut at a barber's is liable to have a disgusting and troublesome affection, lasting for months.

Small-pox in Massachusetts.

(By the Secretary, and our Correspondents.)

This paper should be read by every one, especially by local Boards of Health. It shows that unintermitting vigilance against the first inroads of the disease, and prompt measures for the seclusion of patients ill with it, together with a thorough vaccination of all children, and of all non-vaccinated or imperfectly vaccinated adults, are the only safeguards for a community. If in all the places in this Commonwealth the above rules had been always adhered to, the greater part of three thousand dead from small-pox in Massachusetts in twenty-eight years would have been saved.

The epidemic in Holyoke in 1870 might have been prevented. That in Lowell in 1871 was probably started by one case which was concealed from the authorities. No complete seclusion of the sick could be made until it was too late.

The prevalence of small-pox during the past year in this country as well as in Europe, induced the Board to issue a circular concerning it to the various towns of Massachusetts.

We would call the attention of the legislature to the defects of the present law relative to small-pox, and we think that the 51st section of the 26th chapter General Statutes of Massachusetts should be repealed. If that were done, small-pox would be more completely under the control of local Boards of Health, and they could act efficiently in any case to secure isolation of the disease.

Health of Towns.

In this division of our Report will be found letters of interest from our correspondents in the various towns. Among them will be found information concerning lead-poisoning and typhoid fever, which came too late for our reports on these special subjects in 1871. Suggestions like those concerning the ventilation of workshops, may lead to a special investigation of this most important matter.

The causes of disease are obscure, and the elements which combine to produce it are complex and diverse. We welcome all observations on this subject coming from men whose lives are devoted to its study, but we do not by the publication of their opinions express the belief of the Board in their correctness.

Health of Boston.

We have seen with great pleasure two propositions made during the past year in the Boston City Councils. One relating to the appointment of inspectors of meats, fish and vegetables, with power to seize and destroy all such articles which are offered for sale in a condition unfit for food. And another proposing that the powers of a Board of Health be transferred from the Board of Aldermen to a distinct and independent board holding office for a term of years, and selected with reference to their fitness to meet the important questions which must constantly engage their attention.

We believe that such reforms would prove of inestimable benefit to the metropolis, and the same general plan would be equally useful in other cities of the Commonwealth.

Model Lodging and Low Tenement Houses.

Among the papers given in last year's report, was one on the above subject. A low tenement house of a most infamous character in Boston, the "Crystal Palace," was described (page

221 and page 212,) and there was a brief account of the labors of Miss Hill aided by Mr. Ruskin of London, in their "Organized work among the Poor." It is very gratifying to learn that these statements produced important immediate results. Near the close of the session of the last legislature, the Boston Coöperative Building Company was incorporated. It had for its object the building and hiring of tenements for the poor, with the idea of improving the abodes, and thereby benefiting the people, sanitarily and morally.

With sufficient capital it has purchased a large lot of land in East Canton Street in Boston, and it is erecting a block of buildings thereupon. But the most interesting and important act the corporation has performed was the hiring, in September last, of the Crystal Palace. It was described, in our last year's report, as the abode of filth, robbery, drunkenness and prostitution. The company hired it with the intention of improving the building, and, as we have stated, with the hope of improving also the tenants. At the same time it expected to obtain a fair return for money invested.

It is too short a time for any real reformation to have taken place in adults. But, under the rule of the company, the following most interesting results have been obtained: The building outside, instead of being a disgrace to the street by its filthy look, has a neat appearance. It has changed its name, and now, instead of the name of contempt, "Crystal Palace," it is styled the Lincoln Building.

Before the corporation entered, riot, disorder, and arrests for drunkenness and family broils, were of constant occurrence. The place was the objective towards which apparently all the scoundrels of the neighborhood congregated. During the first two months the agent was not unfrequently obliged to grapple with and forcibly eject wretches who came apparently for the purpose of doing violence to helpless women and children, and from which, under the previous regime, they had no escape. Daily did intoxicated persons seek the corridors of the building to sleep off the consequences of debauch. All is now changed. The trade of the police is virtually gone. The chief of the district reports that during November and December he heard of no complaint there. The grog-shop that had existed from the time of the erection of the building, was swiftly swept away. A "Holly-Tree Coffee House" will take its place. The basements, those human slaughter-houses, were shut up immediately after the company took possession. Very large shafts have been cut through the roof of the building, through all the floors, with ventilators above them, and rooms that have never had light and air now have a sufficiency of both. During the three past months the amount of illness, as reported by the dispensary physician, has been only one-third of what it was in a corresponding period before these improvements were made.

A sewing school has been established. On Christmas Eve a Christmas-tree arose in the building, and neat children gathered happily around it,—a fact that has never occurred before. On January 7th, 1872, as a harbinger of thrift and economy as it is hoped during the ensuing year, $18.10 were deposited in a Five Cents Saving Bank in Boston by thirty-two children.

Truly if the Board had done nothing more than to have been indirectly a stimulus to prove by this example what can be done towards elevating the people, both physically and morally, it would not have served the State in vain.

The Board heartily commends the work of the company as one well worthy of imitation in Boston and in every city of the Union. It is supposed to be the intention of the company to extend its operations still further, and to hire other buildings of the same character after all the intended reforms at the Lincoln Building shall have been fully carried out, and shall be in easy working order.

Records of Sickness.

The practicability of recording the diseases prevalent in any community is at present the subject of interesting discussion in Europe. It has been but little mooted in the United States.

No feasible general plan for obtaining this valuable information has as yet been devised. There is doubt in many minds as to the value of such records, since they must, from the nature of the case, be imperfect. Many physicians keep no notes of the cases under their charge. The records of others should not be made known. But nothing is or can be perfect in this world, and the argument holds against all investigations, since no man can ever hope to arrive at absolute truth. We believe that the object is a most desirable one. We desire to know our constant working force, and how many days are lost by disease. We cannot apply our remedies to the best advantage without a knowledge of the prevailing forms of sickness.

If it were possible to obtain from all hospitals, dispensaries and infirmaries, monthly reports to this Board of all cases of disease coming under their care, it would lead to valuable general results. From such returns the prevalence and progress of epidemics might be made much more apparent than they now are, and their relation to some great cosmic or telluric laws perhaps discovered. If such a plan were commenced in Massachusetts, and gradually extended through State Boards of Health to each of the United States, the grand idea of a National Department of Health, proposed many years ago by Jeremy Bentham, might be realized.

Watching closely the signs over such an extended horizon, a central observer might be able to give signals of approaching danger similar to those concerning the weather now furnished by the Signal Service of the War Department.

Expenses of the Board.

It will be seen in a statement under this head that the expenses in 1871 amounted to $2,843.05. The requirements of the Board are very difficult to foresee. It is hoped that the same liberality and confidence may be extended to us in the future, and that we may be permitted, as in the past two years, to expend a larger sum if it should be needful.

Weekly Report of Deaths.

A weekly report of deaths, commenced in November 1869, has been made every Wednesday during the year in the "Boston Morning Journal." It has included the largest cities and towns, with few exceptions. We desire to express our thanks to the registrars and clerks who have furnished this information.

Subjects of Present and Future Investigation.

In addition to the subjects on which special reports are now submitted, others have received attention, and their investigation will be continued. Among them may be mentioned "Consumption; its causes and the means for its prevention," and "The food of the people of Massachusetts."

All of which is respectfully submitted.

HENRY I. BOWDITCH,
RICHARD FROTHINGHAM,
R. T. DAVIS,
GEORGE DERBY,
P. EMORY ALDRICH,
G. V. FOX,
WARREN SAWYER,
Members of the State Board of Health of Massachusetts.

EXPENSES OF STATE BOARD OF HEALTH 1871.

Postage and stationery,	$529 25
Travelling expenses of Secretary,	130 51
Express charges,	95 06
Constables' fees,	53 26
Clerk hire,	182 25
Carriages,	152 00
Architect's services,	51 00
Personal expenses of members while engaged in the duties of the Board,	178 58
Printing,	136 51
Telegraph,	6 04
Soldier messengers,	51 45
Chemical examination of arsenic wall-papers,	40 00
of tannery waste,	30 00
of canned-fruits,	55 00
Special investigations concerning sewing machines,	256 25
adulteration of food,	150 00
parasitic diseases,	200 00
opium,	100 00
arsenic,	150 00
foot-and-mouth disease,	60 00
the insane,	100 00
consumption,	129 37
Miscellaneous expenses,	6 52
	$2,843 05

ARSENIC IN CERTAIN GREEN COLORS.

By Frank W. Draper, M. D.

ON THE EVIL EFFECTS OF THE USE OF ARSENIC IN CERTAIN GREEN COLORS.

Everybody knows that arsenic is a deadly poison. Its name at once suggests to the popular mind a virulence of action possessed by only a few of the kindred agencies which are placed at the disposal of mankind. Although recognized by the physician as a valuable remedy under certain conditions, its administration is advisedly attended with special caution, its minimum dose being fixed at a very small fraction of a single grain. Murderously-disposed men have found it a quick and subtle means for the accomplishment of their malicious purposes; and discontented mortals, tired of life, have taken it as an efficient instrument for self-destruction. In acknowledgment of its deadly power, wise legislative enactments have prudently regulated and restricted its sale by druggists and others, with a view to protect mankind, as far as may be, from the evil effects of its indiscriminate distribution.

In contrast with this general knowledge of the poisonous properties of arsenic, and with the carefully devised measures which are enforced in order that the least possible harm may result from the employment of such an agent, is its unrestricted use in certain arts and in the manufacture of certain articles which, by most persons, are deemed harmless. The application of arsenic as an ingredient in certain pigments is very extended. It finds its way thus into our dwellings, is spread on the walls of sleeping-rooms, is worn in articles of dress, and assumes a great number of forms in which its presence is unsuspected or, if recognized, is not deemed deleterious. It is the object of this paper to point out some of these forms in which arsenic is introduced to daily use, and to inquire if this liberal exposure is productive of harmful results.

The investigation is not an original one. At various intervals during the whole of the present century, attention has been called to the subject by scientific observers; strong warnings have been given of the danger which was believed to be entailed, and earnest appeals made for some effective legal measures of restriction or of prohibition. So long ago as 1740, the employment of arsenic, as a pigment in certain manufactures, was forbidden in France, and attempts have been made from time to time since then to regulate trade in this respect. These warnings and enactments have however proved but partially effectual; and it is believed that, at the present day, the subject is one which warrants solicitude in behalf of the public health, and justifies renewed investigation by its continued magnitude.

Arsenic, aside from its utility as a remedial agent, is chiefly employed to form an ingredient of certain green coloring matters. It enters into two of these pigments, — the arsenite of copper, which is Scheele's green, and the aceto-arsenite of copper, called also Schweinfürt green from the town where it is largely manufactured. To both of these, names are moreover given interchangeably, and they are generally known among workmen as emerald green or " emerald," mineral green, sometimes (although erroneously) as Brunswick green or Vienna green. In France, they are called *vert Anglais* or English green. Of these colors, the former (Scheele's green) contains more than one-half its weight (55 per cent.) of pure arsenious acid or white arsenic; while the Schweinfürt green is still more abundantly supplied, having in a hundred grains, 58 grains of the poison.

Either of these combinations of arsenious acid and sulphate of copper forms a very beautiful and durable green color whose brilliancy will bear any light well. Its tint is a lighter and purer green than any other of artificial manufacture, and hence is especially alluring to the eye. The materials of which the pigments are made are comparatively inexpensive, and the manufacture involves very little intricacy or delicacy in its various processes. For these reasons, these arsenical greens have always maintained their popular favor, both with manufacturers and the public in general. Their use has been and still continues to be extensive and lucrative, giving employment to large numbers of workmen. So important has their application been considered in the making of wall-paper and of artificial flowers in Paris that when, at one time, it was agitated whether it were practicable to prohibit the use of arsenic in these arts, certain of the manufacturers protested that such an edict would necessitate the absolute suspension of their works. In 1860, a manufacturer of paper hangings in England stated that he used two tons of arsenic weekly;* and the amount of the color annually manufactured in that country was estimated in 1862, at from five hundred to seven hundred tons.†

It should not be inferred from these statements that all green pigments in ordinary use are arsenical. Not a small proportion of the green colors employed for painting, dyeing or color-printing, are of other and comparatively harmless composition. It is not always easy to distinguish them by their physical appearances, but chemistry affords a ready test which may be easily applied. The suspected green material is to be placed in a solution of ammonia (*aqua ammoniæ*). If arsenite of copper be the coloring agent, the liquid will acquire a blue tint, from the disengagement of the oxide of copper from its combination with the arsenic. If a farther test be desired, a few drops of the colored ammoniacal solution poured upon crystals of nitrate of silver will leave on the crystals a deposit of yellow arsenite of silver.

These arsenical green pigments are both deadly poisons, differing in the intensity of their effects only in slight degree from the pure arsenic of which they are in part composed. Taken into the stomach, they give rise to the same train of symptoms and demand the same prompt antidotes. The combination of the arsenious acid with copper serves only to dilute the poisonous properties of the former and offers no farther protection against its action. Suicides have availed themselves of the pigment as a means of self-destruction. In 1849, a girl, aged 12 years, a maker of artificial flowers, became possessed with a distaste of life remarkable at her age. She swallowed a quantity of the arsenical green powder used in her work; symptoms of acute arsenical poisoning promptly supervened and, in spite of remedies, vigorously applied, the girl died in a few hours.

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* Taylor on Poisons, p. 430.

† Fifth Rep. of Med. Officer of Privy Council, 1863, p. 129.

Such are the properties of the green coloring matters containing arsenic. It remains to study some of the forms under which they are presented to the public, with the dangers pertaining to their indiscriminate employment.

I. *Artificial Flowers and other Articles of Dress.*—The manufacture of artificial flowers constitutes an important and extensive industry both in this country and abroad; and into some of its various branches the employment of the arsenical greens has largely entered. Many of the green sprays of artificial grass and leaves which so closely imitate the verdure of nature and bring out in artistic contrast the floral colors with which they are combined, owe their delicate shade and brilliancy to the presence of emerald green.

The process of manufacture is a simple one. Generally, the texture from which the leaves are to be cut is colored in the piece. The coloring material is made by thoroughly stirring together a mixture containing, in definite proportions, the green pigment, cold water, and starch, gum-arabic or some similar substance which shall give the color consistence and adhesiveness. Not unfrequently, in this process, the hand and forearm are freely used in the liquid, to expedite the work. Of this mixture, properly prepared, the workman takes a quantity in his fingers, and roughly spreads it over the muslin or fine calico. The fabric is then beaten and kneaded between the hands until it is uniformly colored; the longer this process is continued, the more perfect is the result. The cloth is now fastened to a frame for drying. In all this process of coloring, the hands, forearms and frequently also the face of the operative must become soiled with the green color. It will be also observed that the color is but loosely applied, no mordant being used, as in calico-printing, to fix the pigment in the texture of the cloth.

In the various subsequent processes of cutting, stamping, shading and mounting, to which the material must be subjected, before the plain cloth becomes the artificial leaf, the arsenical green which is used to produce such a close resemblance to natural verdure, inevitably escapes in greater or less abundance and mingles with the ordinary dust of the apartments in which the manufacture is carried on. Moreover, some of the special methods which are employed to perfect the work promote the dissemination of the powder; thus in the operation called "fluffing," which consists in dipping the leaf into warm wax and immediately dusting the dry color upon it from a dredging-box, the workman is particularly exposed to the effects of the freely floating particles. All the manipulations, in short, subject the material to varying degrees of violence by which the arsenical powder is detached. This powder is inhaled by those exposed, and the precaution, sometimes employed, of placing towels or other masks before the mouth and nostrils cannot furnish absolute protection to the wearers. The moist skin attracts the dust, and the clothes give it lodgment. The soiled hands are not often perfectly cleansed before they are used to convey food to the mouth, and an additional source of risk is thus provided.

The quantity of arsenic which, in the various processes of their manufacture, these artificial leaves are sometimes made to take up would appear almost incredible. Careful chemical analysis has determined this amount repeatedly. Hofmann found in a single twig of twelve leaves, ten grains of pure arsenic. A lady might thus carry, in all innocence, to an evening party enough arsenic in her floral adornments to destroy herself and a score of her fellow-guests.

The effects which exposure to the arsenic contained in artificial leaves may produce, either in those engaged in their manufacture or in those who use them, have been renewedly made the subject of careful investigation. Intelligent and impartial scientific observers in France, Germany and England do not hesitate in declaring the pernicious influence of continued exposure to such conditions, and numerous instances are cited to demonstrate not only harmful but occasionally fatal effects. An investigation was made by M. Vernois in 1859, concerning the accidents resulting among the flower-makers of Paris from the use of arsenical greens, and, as the result of his researches, he points out many symptoms which, he believes, may be directly traced to arsenical infection. Among these are included various eruptions on the skin, presenting sometimes a papular form, sometimes vesicular, sometimes a simple diffused redness (erythematous), and sometimes developing to ulceration and gangrene, the seat of the disease being preferably those parts exposed most directly to the irritant action of the poison, as, for example, the hands and face, the former especially presenting ulcerations, if the color enters cuts or abrasions; along with these external symptoms, are loss of appetite, nausea, colic, continued headache, pallor and debility.* Dr. Hassall, writing in England at about the same period, in describing one of his visits to a manufactory of artificial flowers in London, states:—

> "In the same room were two men, eight women and two boys, the condition of all being wretched in the extreme. They were all similarly affected. They all had sores, the girls, at the back of the neck, on the sides of the nose and on the hands; their eyes also were affected, and there was running from the nose. To such an extent was their health affected that they were obliged from time to time to give up their work and return home." †

Dr. Hillier, too, investigated the condition of the London flower-makers in 1861, and found that they "suffered from chronic inflammation of the stomach and bowels, irritation of the eyes, great nervous debility and prostration, with local irritation of the skin of the hands, neck and scalp when the powder was brought into contact with and allowed to remain on those parts." Several work-people stated that they were constantly ill while working with this powder ‡

But besides these generally acknowledged symptoms of chronic arsenical poisoning, as manifested in these people after working continuously with emerald green, still more serious results are possible, and cases are recorded of fatal effects upon specially susceptible organisms. The following is illustrative: In 1861, a girl, aged nineteen years, who had been engaged continuously during eighteen months in making artificial flowers with emerald green, died in London with all the characteristic symptoms of chronic poisoning by arsenic. Her sufferings were very greatly intensified toward the close of life. Examination after death discovered the very evident presence of arsenic in the internal organs.§

These exceptionally fatal cases bear very small proportion, it is true, to the numerous well authenticated instances of less serious results which are notorious among the operatives themselves as arising in their vocation. This is explained partially by the fact that such fatalities might readily be ascribed to other causes, supposing them to occur more frequently, while on the other hand it is obvious that persons exposed to such a noxious influence would probably desist from this work long before the symptoms were serious enough to threaten a fatal termination.

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* Annales d'Hygiène, 2d Ser. Tome XII., p. 319.

† Lancet, 1860, p. 535.

‡ Fifth Rep. Med. Officer, Privy Council, 1862, p. 126.

§ Med. Times and Gazette, Nov. 30, 1861.

But not only do the operatives, who in making the artificial flowers use the arsenical greens, suffer in proportion to their susceptibility and exposure, but in many cases also those who wear them, and those who, like shop-keepers and milliners, habitually handle them. A case is reported of a clerk who always had vertigo, headache, nausea and cough whenever he opened and handled new packages of green artificial foliage.* In another instance which is recorded, a lady's shoulders became the seat of a painful eruption directly after each occasion of wearing a wreath of artificial flowers and leaves at evening receptions; and in two other reported cases, an erysipelatous eruption on the forehead was traced to a similar cause.† The physicians to some of the large London hospitals have expressed themselves as familiar with "the inflamed eyes and disfiguring eruptions," which, as they assert, result from the use of the arseniferous verdure.

It is obvious that of such cases only the most remarkable and clearly defined would be reported; and we may reasonably infer from these that many less distinctive instances really occur. It is not unreasonable to suppose, for example, that the health of milliners, proverbially delicate as a general thing, may depend for its deterioration to some extent upon this factor, as well as upon overwork, crowded and ill-ventilated rooms and insufficient exercise. It is bad enough to inspire an ordinarily foul atmosphere, but it can certainly add nothing to atmospheric purity to mingle with the dust of a room any proportion, however small, of oxide of copper or of white arsenic.

Closely related to the foregoing topic, is the use of the arsenical green pigment in the manufacture of other articles of dress;

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* Dublin Quar. Jour., Vol. XXXII., p. 234.

† Dublin Quar. Jour., loc. cit.

and among these the material called tarlatane, a light fabric resembling muslin, has attracted much attention. The mineral green with which the material is colored recommends itself because of the brilliancy of its shade and of its permanency by artificial light; and the fabric has therefore at times been quite fashionable. A considerable quantity of it is still sold for dresses, or for the trimmings used by milliners. It is known popularly as an " arsenical " green, so that its character is not altogether unrecognized.

In the manufacture of this material, the color is fixed only by starch or size, and when tarlatane is torn, a plentiful cloud of light green arsenical dust arises. The slightest agitation also serves to disengage the colored powder, and to diffuse it through the adjacent air. It is easy to discover how readily the wearer of one of the expansive dresses prescribed by fashion might under certain circumstances surround herself with a cloud of poisonous dust of whose effects on herself and on those about her she would be unhappily ignorant.

The arsenical-green tarlatanes contain nearly half their weight of coloring matter. A sample, procured by the writer in one of the retail stores of Boston, was analyzed quantitatively by Prof. William Ripley Nichols at the Massachusetts Institute of Technology, and found to contain 8.21 grains of arsenious acid (white arsenic) to each square foot. A dress of ordinary dimensions would thus hold feebly in its texture between three and four ounces of pure arsenic.

It would not seem probable that the occasional wearing of such a material would produce symptoms of serious harm to either the wearer or to those around her, the noxious exposure in such cases being limited in time and degree. Yet instances are not wanting to demonstrate its deleterious effects on those engaged in making the fabric into dresses. In one case, reported by Chevallier, five dress-makers were more or less seriously affected after working on the tissue.* Two years ago a similar instance of poisoning occurred in France, where arsenical greens are prohibited by law; and the dress was found to contain nearly eight ounces of arsenic.† On one occasion, where a new ballet was performed at Hamburg, the dancers who represented water-nymphs, were dressed in green tarlatane. These dresses "nearly cost the lives" of those who made them and of those also who wore them. So large was the quantity of arsenic in the fabric that nearly all were more or less poisoned.*

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* Annales d'Hygiène, XII., p. 99.

† Chemical News, Sept. 10, 1869.

In 1869, a case of poisoning from the cause under consideration occurred in Boston, the details of which were given to the writer by one of the persons affected. Four dress-makers, while engaged upon some party-dresses of which the material was arsenical green tarlatane, became simultaneously affected with well-marked symptoms. These symptoms consisted of swelling of the hands and face, a "pimply" eruption on the back of the hands and about the nostrils, running from the nose and free lachrymation. With these local effects were headache, lassitude and a feeling of general illness. The attack coming on in the midst of perfect health and affecting all but one of those who worked upon the arsenical fabric, left little doubt in the minds of the sufferers of the nature of the poison. The symptoms subsided as soon as the exposure ceased.

II. *Confectionery*, *Pastry Ornaments and Toys.*—It would seem hardly possible that any person, save the most reckless or the most malicious, would designedly introduce into articles of food agents of such poisonous potency as the green colors containing arsenic. Ignorance of the properties of Schweinfürt green must have been the only extenuation for the great majority of those confectioners who have ever made use of that substance to impart to their wares a luring but most treacherous color. Doubtless all the coloring materials which are used so abundantly to give to candy its variegated hues should justly be subjected to the closest scrutiny, and many of them should be unconditionally condemned in view of the baneful effects which they necessarily produce, especially in children. It needs no argument to demonstrate the probable results of the swallowing of even the smallest portion of a coloring material which contains more than one-half its weight of pure arsenic; and a single word of warning ought to suffice to banish such sugar-coated poison from candy-shop windows.

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* Medical Times and Gazette, April 11, 1863.

It is a matter for congratulation that, as the result of stringent regulations in other countries, together with a more general enlightenment of the public in such matters, accidents from the use of the metallic pigments in confectionery are now comparatively rare. Repeated and fearful experiences in the past, of which the victims were chiefly children, have borne their fruit. It would probably be a difficult task at the present day to find the arsenical greens designedly incorporated as a color into any candy intended for eating. It would be better for the community if experience had taught similar abstinence concerning the green pigments in other relations.

Accidents do, however, occasionally occur from the ornaments with which confectioners adorn their pastry, and which are not meant to be eaten. These are not infrequently colored in the most reckless manner with emerald green. Misadventures from this source generally affect children who, attracted by the color and the candy-like aspect of the ornaments, eat them inadvertently. A number of cases of this sort are reported. In one such instance, two children ate a portion of a cake-ornament which was colored green, and narrowly escaped death. Ten grains of the colored pastry contained nearly two and a half grains of arsenic.* Dr. Fergus reports a similar experience, in which three children were poisoned, exhibiting all the typical symptoms of the effects of arsenic.† In 1857, in Edinburgh, eighteen persons were made very seriously ill, and one child died, after eating a pastry ornament which owed its green color to arsenite of copper.‡

The ingenuity of caterers has sometimes shown itself in the presentation of the triumphs of their art in a unique manner. M. Chevallier relates that at a grand dinner-party in Paris, attention was directed to a boar's head which had been curiously decorated for the occasion. The ornament consisted of masses of fat, colored alternately red and green, so arranged as to give quite an artistic effect. One of the guests, well acquainted with chemistry, was struck with the rich green color, and reserved a portion for private analysis. He found the coloring matter to be pure Scheele's green, forming about two per cent. of the weight of the fat. It appeared, on inquiry, that the butcher's boy had procured the color from an adjacent shop, in spite of the regulation prohibiting its sale.*

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* London Med. Times, 1849, p. 107.

† London Med. Gaz., Vol. 43, p. 304.

‡ For numerous other cases, see Taylor on Poisons, 2d Ed., p. 431.

The toys of children are a medium by which these poisonous pigments may be introduced into the system and cause grave accidents. Many of the green wooden toys are painted with Schweinfürt green loosely applied, the color being mixed with water only and smeared on the wood, instead of being more securely fixed upon the material by means of oil or varnish; and when one remembers the instinctive habit of young children to carry to their mouths whatever their hands contain, the liability to injury is at once apparent. Moreover, children's hands are always moist, and this moisture can readily dissolve and detach the loosely applied color. The hands thus soiled are put to the face, and, as likely as not, in the mouth. This custom of using the metallic colors on toys is the more reprehensible since it is wholly unnecessary, or, if any color is desirable, vegetable pigments should be substituted. Chevallier cites two cases of acute arsenical poisoning in children from the source alluded to, and remarks: "It is a matter of surprise that other cases have not been brought to the notice of the public, since children are so often seen playing with those cheap toys, with their hands abundantly daubed with yellow, red and green."†

The boxes of water-colors which are in such common use as a plaything for children, contain generally two blocks of green paint, one being of a dark and the other of a light shade. The latter consists of arsenical green. A tablet of this kind, weighing 38.26 grains, was analyzed for the writer by Mr. A. H. Pearson at the laboratory of the Massachusetts Institute of Technology, and found to contain 8.89 grains of arsenic. A child in using these paints will frequently carry the brush to his mouth in order to moisten it with saliva before applying it to the color, and sometimes the paint is itself touched directly to the tongue. It is marvellous that more frequent cases of poisoning from this source do not occur, because not only the green color, but others also of the blocks, are composed of matters of a positively harmful nature. Must it not be considered as hardly less than criminal in the manufacturers of toy paint-boxes to distribute a color containing so large a proportion of one of the most irritant poisons ?

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* Annales d'Hygiène, new ser., Vol. XII., p. 69.

† Annales d'Hygiène, new ser., Vol. XIX., p. 304.

It has happened that children, too young to know the use or nature of these paints, have eaten portions of them and have been seriously poisoned in consequence. Such an instance was reported in 1859 by Dr. Rose; the child took only a small fragment of a green paint, and in half an hour he became cold, pulseless, and fully collapsed. Only by the vigorous application of the proper antidotes to arsenic was the child's life saved.* Four cases, precisely analogous in character, are recorded by Chevallier.†

III.—The arsenical pigments are sometimes used in the *inside painting of houses*, and in this relation they merit a single word. The dangers to health arising from this source are, of course, comparatively unimportant in this country where taste and fashion prescribe the general use of white lead for these purposes of house painting. In some parts of Europe, however, the use of mineral green has been deemed a matter of sufficient importance, on account of its extent, to warrant an investigation into the effects which may occur. M. Kirchgässer of Coblentz published, in 1867, the results of his researches on this subject, and demonstrates the deleterious effects of habitually staying in rooms on whose walls is a coating of arsenical green. The symptoms in such cases are those of chronic arsenical poisoning, and they are identical with those due to exposure under other circumstances; the most characteristic are excessive debility, intermitting pains, cold extremities, a cachectic aspect, and sometimes the appearance of brown patches on the skin.

Dr. Lorinser also asserts his unqualified opinion that chronic arsenical poisoning may occur in consequence of the occupancy of rooms whose walls are painted green, and which owe their color to the arsenical pigments. Numerous cases occurring in his own experience are cited to demonstrate his statements.‡

The following instance illustrates how accidents may arise through inadvertence from the use of arsenical-green paint.

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* Lancet, 1859, Vol. I., p. 237.

† Annales d'Hygiène, Vol. XII., p. 94, new ser.

‡ Wiener Med. Wochenschr. 1859. Nos. 43 and 44.

The experience is not improbable in our own community where the paint is sometimes used on shelves and such other limited surfaces. A distinguished English chemist, Prof. Taylor, observed, adherent to the under crust of the loaf of bread, which had been placed one morning before him for breakfast, certain well-marked patches and streaks of a green color, having somewhat the appearance of green mould. He removed some of the suspicious matter and, subjecting it to analysis, proved it to be composed of "Scheele's green, containing about fifty per cent of arsenic." There was enough on one of the loaves to have killed an infant. On inquiry it was ascertained that the baker, from whom the bread had been purchased, had just had his shop newly decorated, and there were eight long shelves (holding some hundreds of loaves) painted a bright grass-green color, top, front and sides. A number of the loaves were examined in succession and it was found that they were all similarly stained. They had been placed while warm on the shelves and had absorbed a quantity of the freshly applied poisonous pigment. "The baker expressed his ignorance that there was arsenic in the paint; but the painter who was summoned took the matter more coolly and professionally, remarking that it was impossible to get a good green without arsenic, that he had used it for many years and he had never heard of any one being killed by it." The author remarks: — "It is easy to conceive that an accident of this kind, if undetected, might lead to serious results, and perhaps to very erroneous suspicions." *

A case analagous to the foregoing occurred in Vienna. An entire family were made seriously ill by eating strawberries which had been kept a few hours in a box whose inner surface was painted green. The paint, on analysis, was found to be colored with arsenite of copper.†

IV. Every person must be familiar with the appearance of the brilliant *green paper* which is used so extensively for covering paste-board boxes, for show-cards, for tickets, for wrappers, for lamp-shades and for a great number of similar purposes. This paper owes its bright tint in all these forms to the presence of arsenite of copper. It contains a large amount of the poison-

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* Med. Times and Gazette, April, 1854, p. 326.

† Oester Med. Wochensch. 1841.

ous material in proportion to its weight. The sample herewith presented contains, according to the analysis of Mr. Pearson, 8.67 grains of arsenic in each square foot.

The accidents to which this method of employing arsenic may give rise are, as will readily be seen, chiefly of an acute order, and grow out of the danger, to which children are especially liable, of swallowing the poison in the manner alluded to in connection with toys. The matter has received particular attention in France, and the use of arsenical-green paper for the purpose of enveloping articles of food, confectionery and the like is absolutely prohibited; in his instructions to his subordinate officers, the Prefect of police of Paris applies the interdiction of these papers to "bags, envelopes, boxes or labels as used by all dealers in provisions or articles of food whatsoever."*

Such a sweeping proscription would certainly appear impracticable in our own community, but it serves to illustrate the magnitude of the subject as it is regarded in other countries. Certainly the very general use of the material in question, under a great variety of forms, must be obvious to the most casual observer, and when the eye once becomes accustomed to the characteristic shade, and looks for it, it is surprising to observe to what a multiplicity of uses the paper is applied. It will not be unprofitable, therefore, to utter a word of warning concerning the dangers which are possible, and to cite cases which exemplify them.

Perhaps the most reprehensible use to which the green paper is put is as a wrapper to packages of confectionery, chocolate and the like, a practice which is becoming too common. One of the most reputable of the confectioners of Boston displays in his windows and on his shelves, with other confectionery of his own manufacture, rolls of lozenges enveloped in the bright green paper; and the same custom is to be repeatedly observed in other stores. Children, readily allured by the bright tint, obtain this candy, and if they do not swallow a portion of the poison with the sweetmeat, are not generally unready to put the paper wrapper to their mouths, child fashion. A case is recorded by Chevallier in which a child was poisoned in this manner by a piece of green paper. The mother of the child had given him a fragment of chocolate around the end of which, for the sake of neatness, she had wound a portion of the paper in which it was originally enveloped. In sucking the candy, the child also took into its mouth some of the coloring matter from the paper, and narrowly escaped death in consequence.*

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* Circulaire aux Com. de Police de Paris, Nov. 28, 1855.

An accident like the following is liable to occur at any time to an organism equally sensitive to the action of poisons, where price-cards covered with arsenical green are so freely used.

> "A lady purchased a quantity of prunes of which she cooked a portion. Soon after eating some of them she was attacked with vomiting, which continued several hours. Not suspecting the cause of her illness she took more of the prunes and suffered a recurrence of the symptoms. Then it was noticed, on careful search for the cause of her trouble, that some of the fruit was stained with green. On returning the prunes to the grocer, he recognized the fact that the color proceeded from a green price-card which had rested on them; the fruit being moist had taken up a portion of the coloring matter from the paste-board. The pigment was found to consist of Scheele's green." †

The instance which follows is also suggestive of a quite common exposure:—

> "A watchmaker had a very troublesome and irritable ulceration of the mucous membrane of the mouth. The smarting and annoyance were almost intolerable, and became much increased in the evening, when the lips swelled and became so painful that eating or even speaking could scarcely be indulged in. In prosecuting his work, he was in the habit, in the evening, of using a gas-light, before which to protect his eyes he had a bright green paper shade. On analysis, the color of the shade was found to be due to the presence of aceto-arsenite of copper (Schweinfürt green). The heat from the light was believed to have decomposed a portion of the arsenical pigment, producing the characteristic odor and causing the acute symptoms in the workman. Speedy recovery followed the disuse of the shade." ‡

In 1861, the following case occurred in Boston, and was reported in one of the local medical societies. A young child, in playing with a small green concert-ticket, put it to his mouth and detached and swallowed a portion of the pigment. Violent symptoms followed. A duplicate ticket was analyzed quantitatively by Dr. C. T. Jackson and was found to contain in its green coating nearly two grains of pure arsenic.*

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* Annales d'Hygiène, XIX. p. 304.

† Annales d'Hygiène, XII. p. 71.

‡ Lancet, Jan. 7th, 1860, p. 8.

V. *Paper-hangings.*—Important as are the topics which have thus far engaged our attention in the study of the arsenical greens and of the possible dangers incident to their use, they appear to have always been considered as of less significance than those relating to arsenical paper-hangings. Since Prof. Gmelin of Heidelberg called attention, in 1843, to what he deemed the deleterious effects of living in rooms whose walls were decorated with green paper, the subject has been repeatedly investigated in all its relations. Distinguished scientific authorities in Germany, France, England and America have regarded the matter as one eminently deserving careful consideration, and the unanimity which characterizes the results of their studies can leave little room for doubt in unprejudiced minds concerning the harm which may ensue, under certain conditions, from the use of arseniferous wall-paper. Other observers, comparatively few in number, who have arrived at negative or at wholly dissenting conclusions seem to have based their experiments on wrong premises or to have shown partiality in their statements.

As a result of the unequivocal warnings published by physicians in past years, the use of the arsenical paper-hangings became for a time and in some degree unfashionable. But the dictates of fashion are capricious, and are not long mindful of the protests of science. The public has forgotten the experiences of ten years ago and the poisonous paper-hangings are displayed in the shops to-day with the same fascinations of color, design and finish that has characterized them in the past. In every store which the writer has visited in the course of these investigations, specimens of the paper have been obtained which, on being tested, exhibited the presence of the arsenical pigment in a greater or less degree.

This renewal of a practice which has been condemned heretofore in terms of unconditional disfavor justifies a renewed investigation of the subject. It is a matter of no ordinary importance to a community to know that, by the use of paper-hangings of a certain color, the health of individuals is seriously jeopardized. It is not a pleasant thing to realize that the very means we take to make our homes more cheerful may become the direct source of impaired health, and that the beautifully artistic designs which decorate the rooms in which we live or sleep may be the subtle agencies whereby the sum of human misery is increased.

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* Boston Med. and Surg. Jour. Vol. 64, p. 121.

It ought to be remembered, at the outset of this inquiry, that all paper-hangings which are green are not to be condemned as poisonous. Not a small proportion owe their tint to other pigments than the arsenite of copper. And this fact that the arsenical papers are found in comparatively good company adds another element of importance to the subject, suggesting the greater need of discrimination. Moreover, with regard to paper-hangings which are actually arsenical, it will be perhaps exceptional to find specimens colored to any great extent with the unadulterated arsenite or aceto-arsenite of copper, as distinguished by the purity and brilliancy of the green tint, because it is the custom of the manufacturers to modify the shade of green by the addition of substances which shall make the tint darker or lighter to suit varying tastes; yet the primary pigment contains arsenic, whose presence can be detected only by the chemist's tests and not by any distinctive physical appearance. To proscribe a wall-paper, therefore, because it is green, and, without farther test, to condemn it even though it be found on the room of a confirmed invalid, would be hasty judgment; while, on the other hand, cases undoubtedly occur in which obscure and distressing symptoms are due to arsenical poisoning, the agent being concealed in a tint bearing so distant a resemblance to the brilliancy of pure emerald green as to readily escape detection.

In the manufacture of paper-hangings, no provision is made with a special view of anticipating and preventing any possible harm which may result from the employment of the arsenical pigment. Whether the pattern be a plain or a figured one, the coloring matter is made to adhere to the paper by means of size. The emerald green, generally adulterated with Paris white or some other neutral agent in order to obtain the desired shade, is mixed with warm water in which size has been dissolved ; in this process of color-mixing the workman often uses his hands, plunging the fore-arm nearly up to the elbow into the sieve through which the ingredients are passed. When the color is prepared, it is applied to the surface of the paper by means of a series of brushes, worked by machinery, and a uniform coating is thus quickly secured. Passing from this machine, the paper is suspended in long loops from sticks which rest on a slowly moving, endless chain arranged near the ceiling ; being carried thus in loops the length of a long room whose temperature is maintained at a high degree by steam apparatus, the paper becomes thoroughly dried. If it is to be "satined" or glazed, it is passed through a series of dry brushes which revolve with great rapidity. The figured patterns are printed by two methods. The slower, but more accurate process, and therefore better adapted for fine work, is by hand-printing, the pattern being secured by blocks, a color at a time, precisely as in the earliest days of paper-hangings. But most of the printing is done by machinery not unlike that used in calico-printing. The paper is passed against a series of revolving wooden cylinders on whose surface are raised figures corresponding respectively with the individual shades of color to be observed on the paper when finished ; each cylinder is fed with its own pigment by means of a revolving belt of fine woollen, which passes through a trough of color. The variety called "flock-paper" requires a special process to give it the well-known roughened or velvety aspect. The flock consists of the finely divided shreds of waste woollen cloth. The stock is scoured and dyed. It is then stove-dried and ground to a fine powder ; the requisite degree of fineness is secured by successive sifting in a bolting apparatus. A quantity of this woollen dust is enclosed in a large chest or drum, the bottom of which consists of sheep-skin or of strong cloth. The paper is first prepared with a layer of size and then of varnish. If the paper is to be a plain flock, this adhesive material is spread uniformly ; if figures are desired, the pattern only is printed in varnish. Successive portions of the paper are passed into the drum, and the bottom of the chest being beaten, the flock dust is raised to settle on the still moistened and adhesive surface, where it is allowed to dry.

From this description it will be seen that the arsenical paper-hangings include three well-defined varieties, according to the methods used to attach the coloring matter to the surface of the paper with greater or less degree of permanency: they are unglazed, or satined, or flock. These comprise all grades, from the most costly to the cheapest, and vary from the plainest surface to the most elaborately figured designs. In some, there is a thick coating of the color, loosely applied, either for a perfectly undecorated paper or to serve as a ground on which to impress the various figures. In others, only isolated or small patterns of foliage contain the green pigment. Of all the varieties, however, those which have an unglazed surface are the most likely to produce harm, since in this class the color is only moderately adherent, and is removed by the slightest friction. The glazed papers are less open to this objection, because the process which gives the polish serves also to fix the pigment more securely. From such a surface the green dust would not escape readily, until, after long wear or by frequent dusting, abrasions in the glazing were produced. The flock papers occupy an intermediate place between the two varieties alluded to. The wool which constitutes the flock is generally of a dark green color from vegetable dyes; and if the arsenical pigment is used, it is found in the ground tint on which the flock is laid or in the green-figured foliage formed in the intervals. The flock as primarily prepared is not poisonous; but it may become so, since it is easily detached from the paper and may bear away with it particles of the subjacent color.

The quantity of the poisonous color which is used upon these papers varies exceedingly, of course, but occasionally it is found in very large amount. Prof. Bacon asserts: "Frequently so much as fifty or sixty grains of the arsenical pigment is spread on each square foot of the paper."* In a specimen examined by Dr. Halley, nearly a drachm of the color was found in the square foot; † and Dr. Taylor states the results of his analyses to vary from twenty-eight to seventy grains in the same surface ‡ Two samples of the paper are presented here-

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* Boston Med. and Surg. Jour., Vol. 69, p. 490.

† Med. Times and Gazette, Jan. 16, 1868.

‡ Taylor on Poisons, p. 434.

with. They have been analyzed for the writer by Mr. Pearson at the Institute of Technology. The lighter-colored specimen contains 5.42 grains of arsenic in each square foot. The paper also shows under what a deceptive guise the arsenical pigment may appear. The second sample, which is typically arsenical, and which represents the color in its purity, has 29.32 grains of pure arsenic in each square foot. Taking the average of these results, a room of ordinary dimensions, decorated with arsenical paper-hangings would hold on its walls considerably more than a pound of a poisonous coloring matter, containing half its weight of arsenic.

The question, however, which most concerns us is, Does the presence of this pigment, in such large amount, on the walls of rooms habitually occupied by day or night, exert any deleterious influence on the health of the occupants? Can an agent, avowedly very poisonous when swallowed, become disengaged in any way, directly or indirectly, from the surface to which it is but loosely attached, and contaminate the atmosphere to such a degree as to produce by slow but continuous absorption unmistakable symptoms of injury? There will be those who, through incredulity or from motives of interest, will cite cases of perfect immunity under such conditions and will maintain that the brilliant color is inert, even granting the presence of arsenic, and that there is nothing in the paper-hangings in question to arouse alarm or suspicion. The alleged cases of illness from this cause ought rather, they say, to be attributed to bad ventilation and other abuses. Nevertheless, when the many recorded and well authenticated instances of impaired health, including a considerable number which have terminated fatally, are examined impartially, little room is left for skepticism. The cases are too numerous and too unequivocal to be thrown aside, and constitute a mass of evidence which cannot well be refuted. It will be unnecessary to cite a great number of these cases here. The columns of the medical and of the general press of the last ten years contain the histories of numerous instances; and of these only a few of the typical ones will be quoted as illustrations.

Dr. Halley of London, has reported a case of arsenical poisoning in which he was himself the victim. His library-walls had been covered with a newly made, rich, emerald-green flock-paper. Shortly after the work was finished, he commenced to occupy the room regularly every evening, for some five or six hours, a single gas-burner supplying the light. After a few days he began to suffer considerably in health ; there was constant headache, dryness of the throat and tongue, with internal irritation. After three weeks of this experience, he became completely prostrate, not yet, however, suspecting the cause of his malady. Partial paralysis of the left side supervened. His condition obliged him to discontinue his studies in his library, and coincident with this intermission he began at once to recover. But as soon as he recommenced his labors, the symptoms recurred. His attention was now called to the paper on the walls of the apartment. It was found to contain nearly sixty grains of Scheele's green to the square foot. The air of the room was likewise tested, and distinct crystals of arsenic were obtained from the dust. The paper was at once removed and there was no farther trouble.*

In 1862, a case of fatal poisoning under the conditions in question occurred in the suburbs of London, the victim being a child. The cause of death was made the subject of an investigation before a coroner's jury. In the course of the evidence it transpired that the deceased was the last of four children who had died within a period of two months under exposure to the poison contained in the paper-hangings of the room they habitually occupied. They had all been attacked in the same manner, the prominent symptoms being referred to the throat. The color was loosely applied, having no glazing. It was very deliquescent ; at 50° it was quite damp and the stain came off on the hand like paint. Three grains of arsenic were found in a square foot of the paper. The symptoms were attributed by the surgeon in attendance, Mr. Orton, and by Dr. Letheby, who made the *post mortem* chemical examination, to arsenical poisoning.†

In a case reported by Dr. Guy, the patient being a young lady, there were observed gastric irritation, emaciation, flatulence, pain in the abdomen, loss of appetite, nausea, a furred tongue, dryness of the mouth and throat, a quick, small pulse, oppressed respiration with dry cough, failure of strength, an aversion to food and drink, a blanched complexion. Temporary absence from home brought relief to the sufferer, but it was not until after recurrences of the symptoms coincident with the return to the arsenical room, that the wall-paper was suspected. The paper was removed and a plain white paper took its place, and no further symptoms of poisoning were experienced. The workman who removed the arsenical paper was very ill the whole night and day following, "with cramps, sickness and pain." The green paper was a glazed watered pattern, covered with two shades of the most delicate tint.*

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* Med. Times and Gazette, Jan. 16, 1858.

† Med. Times and Gazette, May 3, 1862.

Dr. Hinds reports an experience not unlike that of Dr. Halley. He says :—

> "In 1849, I ordered my study to be re-papered, and I selected for this purpose a neat paper, with only about two shades of green, of a bright and elegant tint. In a day or two after the room was papered I began to use it. I had a fair gas-light, and towards evening I began to read. When about an hour and a half to two hours had passed, symptoms of severe depression seized me, soon followed by a feeling of nausea and an inclination to vomit. There were occasional pains in the abdomen also, and the prostration was presently accompanied with a feeling of faintness which suspended my operations. The very same thing occurred every successive evening, when the door of the room was closed, the gas-light burning, and after I had remained about a couple of hours in the room. The unpleasant symptoms gradually subsided when I had left the room, a feeling of faintness and some stomachic derangement alone remaining."

The green pigment, on being sublimed in a test-tube gave abundant crystals of arsenious acid. The paper was removed and the annoyance never reappeared.†

Dr. Hinds also reports other cases under his personal observation. In one of these, a gentleman of Birmingham had two parlors papered with a bright green paper. In less than a week afterwards, both himself and his wife, previously in good health, became ill. They were in the habit of sitting in one of the rooms regularly. The symptoms complained of were great prostration of strength, headache, and a low, febrile condition, together with inflammation of the eyes (conjunctivitis), thirst, loss of appetite, heat and dryness of the throat, with tightness across the forehead. The great inaptitude for exertion and general prostration of the strength appeared prominent. As in the previous cases, temporary absence from home was attended with a remission of the symptoms, and the removal of the paper was followed by early and complete restoration of health. The paper was of the "flock" variety, with a profuse pattern of a light and elegant green on a flock ground, yielding, on analysis, an abundance of arsenic.*

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* Fifth Report, Medical Officer, Privy Council, p. 137.

† Med. Times and Gazette, May, 1857.

Dr. James Whitehead of Manchester, England, has recorded an instance which may be cited as a typical one, not only as illustrating the disease in question, but as affording an example of the difficulties sometimes experienced in determining its true character. The patient, a young man, suffered from ulceration of the gums and of the tonsils, violent frontal headache, great languor, nausea and occasional vomiting, inappetence for exertion, and disturbed sleep. The complaint, mild at its onset, gradually increased in severity in spite of medical treatment, and at the end of eight or ten weeks the patient was removed to the country; here he was speedily restored to health. On his return home, perfectly well, he was placed in the same room he occupied before; in the space of four weeks he was worse than ever. The drains being suspected of some indirect influence in causing the diseased condition, they were examined, but nothing was discovered to account for the trouble. Attention was next directed to a cistern which adjoined the wall outside the patient's room, and it was remodelled with the hope of remedying the mischief. The repairs necessary for this change required the patient to occupy another room for a fortnight; this intermission was attended with considerable relief, and he returned to his old apartment feeling much better. The former symptoms recurred with aggravated severity, and now for the first time it was suspected that the wall-paper was the source of the mischief. The paper was replaced without loss of time by one of a totally different shade, and results every way satisfactory followed. There was no relapse of the symptoms after the removal of the paper, and the young man occupied the room without further annoyance.

The paper was a "rich, green, flock paper." While it was being applied, a green dust escaped freely; and afterwards, whenever the walls were cleaned, a similar powder was found on the furniture. Thirty grains of the pigment yielded, on chemical analysis, eleven grains of arsenic, and it was estimated from this that the room, having a superficies of three hundred and fifty square feet, held in its paper-hangings, after four years of usage, 3,850 grains or about a half a pound of white arsenic.*

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* Med. Times and Gazette, May, 1857.

But in studying the reported cases of wall-paper poisoning, we need not confine our selections to observations made in other countries. Abundant testimony is afforded in our own midst; and this fact, that the pernicious effects of using the arsenical paper-hangings have been recognized and experienced here, and that cases have repeatedly occurred demonstrating the susceptibility and exposure of our own people, is of obvious importance and possesses a value which investigations at a distance could hardly be thought to have in comparison. The following are some of the instances which have been observed in this community:—

A well-marked case of poisoning occurred in 1863 in Boston, and was reported by Dr. W. E. Rice, The patient was a woman aged seventy-five years. After living a few days in a room which had been papered with a bright green paper, she was attacked with a burning sensation in the throat and stomach, with frequent, though slight, vomiting after taking food. She had diarrhœa with some dysenteric discharges. There was also great weakness, with trembling of the limbs and loss of appetite. Subsequently, severe cramps came on in the stomach and bowels; the skin was clammy; the voice was altered; pulse, 100; bowels constipated; abdomen very tender on pressure. There was violent retching and vomiting on taking small quantities of either liquid or solid food. All these symptoms were much aggravated after sweeping or dusting the room. Proper treatment alleviated the distress; but when the room was again dusted, the symptoms recurred with renewed violence. The residence of the patient was now changed, and recovery followed. The paper was found, on examination, to contain arsenite of copper in its pigment.†

The notes of the following case were communicated to the writer by the individual who is the subject of the report: In the autumn of 1859, a middle-aged lady, the wife of an eminent citizen of Boston, commenced to occupy a room which had been freshly decorated with wall-paper whose pattern consisted of alternate stripes of gilt and green flock; of the poisonous character of the latter she was wholly unaware. Excepting a neuralgia from which she had long suffered, she considered her health at this time to be perfect. Soon after beginning to habitually sit in the apartment, she noticed a change in her feelings. The neuralgia, which previously had been only annoying, became intensified. She had headache and vertigo. There was nausea and distressing vomiting. The appetite was impaired, there was a dry cough and a bad taste in the mouth. Marked emaciation was manifest and an almost intolerable sense of prostration and exhaustion ensued. All these symptoms compelled her to keep the room the more continuously. Remedies were meanwhile applied unavailingly, since the cause of the ailment was not detected. In the following summer, a stay of several months in the country was attended with distinct relief; but a return to the town-residence was followed by a renewal of the painful experience, and during the winter months, while the room was occupied, the patient suffered distressingly. A second summer's absence brought a second season of respite, only to be followed by a third attack which renewedly baffled the skill of the attending physician. The symptoms at this period were of the most aggravated character. Frequent attacks of fainting, intense paroxysms of neuralgia, dizziness, almost incessant vomiting and great prostration reduced the patient to the last extremity, and her life was despaired of. At this time, when the sufferer was almost moribund, it occurred to herself that the possible cause of all her deplorable state was in the green paper of her room. A sample was at once analyzed by Dr. A. A. Hayes and was pronounced by him to be "loaded with arsenic and extremely unsafe." From this discovery was dated the beginning of the patient's recovery. The paper was removed as soon as possible, but so fully had the patient's system become charged with the poison and so depressing were its primary effects that the consequences of the renewed infection are experienced to this day.

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* British and For. Med. Chir. Rev. Vol. XXIII., p. 519.

† Boston Med. and Surg. Journ., Vol. 69 (1863) p. 297.

The coloring matter of the paper had become so loosely adherent that on passing the hand or a cloth lightly over its surface a distinct green stain was left. The workman who removed the paper from the walls was made seriously ill, although precautions were taken to prevent that accident; and it was ascertained also that the paper-hanger who had originally applied the paper was similarly poisoned.

The writer is indebted for the history of the following instance to Dr. John Jeffries of Boston, under whose observation it occurred: A married lady, in good health but feeling somewhat diminished vigor from attendance on her infant child, changed her residence. About two months after the change was made, her health became notably impaired without apparent cause. She suffered from dyspepsia, the attacks of which were increasingly severe; there was emaciation, lassitude, prostration and recurrent fainting. In the spring following a winter of this experience, the patient left the city, and during an absence of several months her health became fully restored. Another winter's residence at home brought a renewal of the former symptoms, with occasional headache and temporary paralysis of the limbs; the emaciation and prostration of strength were marked. A second summer's absence was attended with another remission in the condition of the patient, but the restoration was compromised by unusual anxiety in behalf of others. Her return to her residence developed all the former symptoms in an aggravated degree; with these, there were frequent and severe attacks of pain in the bowels, diarrhœa with occasional bloody evacuations (the latter coincident with an unusually prolonged stay in the house), cramps in the bowels and limbs, frequent loss of sensation and of the power of motion in the extremities and constantly progressive emaciation and debility. A change of residence was again advised and made. During the patient's absence the lead pipes in the house were removed and the copper tank was replaced, under the impression that some noxious influence, peculiar to the house, was constantly at work upon the patient's system. The lady returned recruited, after an absence of three weeks, but began at once to fail again. An accident compelled her to remain more constantly at home and finally to keep her room. It had been already suspected, and it was now definitely discovered that the green paper-hangings on the walls of the bedroom and of the sitting-room contained arsenic and that they were the source of all the trouble. The patient was at once removed to another house, and while the process of removing the arsenical paper was in progress, she constantly improved. After a month, the offending paper having all been disposed of, she returned to her home. Within a few days, she suffered from a sudden attack of diarrhœa, with smarting of the eyes and headache ; it was discovered that on the day before this seizure she had dusted some books in one of the rooms before alluded to.

The wall-paper had a large floral pattern, with abundant foliage, well supplied with arsenical green. The patient feels some of the effects of the poison after an interval of nearly fifteen years.

The following case is characteristic. It was communicated to the writer by the physician in attendance :—

"Mrs A.'s illness was during four months of 1864. The first symptoms were those of catarrh of the nose and pharynx, with much pain and of an obstinate character, but not confining the patient to the house. Towards the end of April, she was in her chamber a good deal of the time, and she became much worse early in May. The symptoms chiefly complained of then were pain in the throat, difficulty of swallowing, diarrhœa, nausea, pain in the abdomen, and much prostration. The pulse was quick and weak, the appetite was gone and the patient seemed very ill. I had, from the first aggravation of the symptoms in the beginning of May, suspected the wall-paper of the chamber to be connected with the disease. It was a handsome paper, consisting of a dark green flock ground, covered with flowers. On mentioning my suspicion to the family I was told that all the wall-paper in the house had been examined by a skilful chemist who found that the parlor wall-paper contained a large amount of arsenic, but decided (from inspection only, as I afterwards learned) that there was no arsenic in the paper of the chamber. Of course the paper was removed from the walls of the parlor, but that of the chamber was allowed to remain.

"One day, while standing by the patient's bedside, being much puzzled by the obscurity of her symptoms, the idea of arsenic again occurred to me, and finding that I could easily rub off the green flock from the paper with my handkerchief, I secured a piece of the paper for examination. The test showed conclusively that the paper contained a large amount of arsenic. The patient was removed to another room, and she began to amend from that time. In the course of a few weeks she was well."

Among other cases which have come to the writer's notice in the course of these investigations, the following are introduced as illustrative examples of the effects under consideration:—

A young lady of Boston occupied, during the winter of 1860–61, a room whose walls were decorated with a paper representing horse-chestnut leaves, in dark green and light green colors, the former being more abundant. It had been on the walls ten years, but the room, being a spare-room, had been but little occupied. Symptoms of a serious character, affecting the lungs, soon manifested themselves after the patient began to occupy the room. She suffered from cough, with great distress in respiration. Subsequently there was an eruption of a papular character, and the ankles were swollen. There was emaciation and great prostration. The friends of the patient despaired of her life. The diagnosis of the true nature of the disease was made by the late Dr. John Ware. The patient changed her residence and restoration of health at once began. There has never been any recurrence of the symptoms which originated in the arsenical room. The paper was analyzed by Dr. C. T. Jackson, and was found to be dangerously charged with arsenic.

A well-known physician of Boston has himself observed the poisonous effects of arseniferous wall-papers in his family and in his own person. He writes: "We were exposed for about five months to the action of the poisonous atmosphere before any deviation from health was experienced by either one of us. The symptoms first displayed themselves about the throat, interfering with deglutition and producing pretty severe salivation. We have ever since suffered from a great variety of symptoms which still cling to us in modified form and severity."

A gentleman, residing in Boston, occupied a room at night whose walls were covered with green paper. One child also, aged five years, slept in the same room. The father lost flesh and strength, suffered from dryness of the tongue, mouth and throat, and was bloated about the face. The child was debilitated, and restless at night, and suffered from pain in the side and a dry cough.

The paper on analysis was found charged with arsenic, and since its removal the symptoms have wholly disappeared.*

Cases like the foregoing might be multiplied almost indefinitely; but it is believed that those which have been cited will suffice to demonstrate the fact that very harmful effects may and do result from the employment of an agent whose poisonous character is well recognized and whose sole recommendation by those who offer it displayed on the paper-hangings which are designed to decorate our walls is that it produces an attractive color cheaply. These recorded instances exhibit a series of symptoms which, upon analysis, clearly show that the arsenical poisoning impresses itself on the human system locally as well as through its general influence. The local effects are precisely such as would be expected from the continued inhalation of an irritant agent, or from its presence in the atmosphere; the dryness of the throat and mouth, the inflammation of the mucous surface of the eye, the occasional salivation, the husky and altered voice, the severe frontal headache (about the frontal sinuses), the nausea and vomiting, the dry cough, all point to an action more or less marked and immediate on the various surfaces with which the poison comes in contact; while the more prolonged and insidious influence is indicated in the great debility and lassitude, the emaciation, the impaired nervous power, the irritability of disposition and depression of spirits, the muscular trembling, the occasional convulsions, the vertigo, the chilled extremities, the restless sleep, the pale, cachectic aspect, the digestive disturbances, and the neuralgia which comprise the general or constitutional symptoms. It is, of course, obvious that all these phenomena will not manifest themselves in the same individual as the results of exposure; nor will they present the uniformity which characterizes other modes of poisoning. Of those in any decree affected, probably the majority would remark only the more primary and insignificant symptoms; for example, after a night's sleep in an apartment with the arsenical paper on its walls, the individual will notice a headache or a dryness of the mouth. It is only after prolonged exposure, or in persons specially susceptible, that the more serious effects are manifested. Thus, it is by a careful criticism of the various symptoms presented in a given case, and by observing the fact that in the presence of the assumed cause no other cause can be discovered sufficient to account for these various local and constitutional symptoms, that we are enabled to arrive at definite conclusions. There are no distinct and characteristic effects which will allow the observer at once to discriminate such a case, as salivation enables him to do in mercurial poisoning, or as the blue line of the gums and wrist-drop, in poisoning by lead. It is, indeed, this very obscurity and want of uniformity characterizing the effects of chronic arsenical poisoning from the cause in question, that has led many writers to question and not a few to deny the possibility of the dependence of such a condition on this exposure. It will doubtless also explain the fact that comparatively few of these instances are recognized in their true and independent relation and are reported as such; for it is plain that only the most unequivocal cases would be likely to see the light through the journals, and we are justified in inferring that a very great number of instances have occurred which from their anomalous character have escaped detection.

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* For farther cases, analogous to the foregoing, see the following: Taylor on Poisons, p. 434; Guy's Forensic Medicine, 3d Ed.; Fifth Report Med. Officer of Privy Council, 1862; Wiener Med. Wochensch., 1859, Nos. 43 and 44; Annales d'Hygiène, New Series, Vols. XII. and XIX.; Lancet, June 7, 1862; Boston Med. and Surg. Jour., Vol. 64; Lancet, Nov. 7, 1860; London Pharm. Jour., Vol. I., Sec. Ser.; Med. Times and Gazette, June 10, 1871; British Med. Jour., July 22, 1871.

This feature is of evident importance, as affecting the public health. If cases were habitually occurring, presenting well-defined signs and readily traced to their cause, the community would entertain no doubt concerning the course to be followed, and arsenical paper-hangings would very quickly become unfashionable. But the individual instances, like some of those cited, are in many respects perplexing and obscure, readily eluding the tact of the physician in his attempts to determine their true character, and baffling him in the application of his remedies; hence there is a vantage ground for skepticism on the one hand and for ignorance on the other.

In this connection it may be observed that the symptoms due to poisoning by arsenical paper-hangings are, notwithstanding the peculiarities above alluded to, strikingly similar to and, in many respects, absolutely identical with those of chronic arsenical poisoning when the agent, swallowed in small and frequently repeated doses, exerts its cumulative action. These latter symptoms are notoriously varied in character and present many apparent anomalies. They follow little regularity of manifestation. In different individuals they are exhibited sometimes with most emphasis in the digestive system, sometimes in the nervous system, and sometimes the influence is a general one and shows itself in a complication of symptoms. Thus it will be seen to be unnecessary to define a distinct train of phenomena as peculiar to poisoning by green wall-paper, since these offer no points of essential difference from those observed in ordinary chronic arsenical poisoning. The difference is one of degree and depends on the more or less prolonged and continuous exposure to small amounts of the poison introduced into the system slowly and by indirect channels.

Although the fact that serious and sometimes very alarming disease follows in certain cases the use of arsenical-green wall-paper is of more consequence to the community at large than any discussion of hypotheses concerning the method of infection, this latter question is not without interest. Various theories have been advanced to explain the processes by which the poisonous pigment enters the system, so as to produce its manifold pernicious effects. Gmelin, who first called attention to the subject in any of its relations, was of the opinion that the poison was absorbed as a volatile gas, the product of a "fermentation of the organic matters with which the arsenic is mixed." A little later, M. Louyet of Brussels declared that this gaseous exhalation was a special form of arseniuretted hydrogen, and based his theory on the observation that when a mixture of arsenic and distilled water is allowed to stand a few days, the water at the end of that time gives out a distinct odor of garlic, which, as is well known, is characteristic of arsenic; and this evolution he thinks due to a decomposition of the water in the presence of arsenic. Analogously, the moisture which is almost always present in the walls of rooms undergoes a similar decomposition, evolving a volatile and very poisonous product. This view he thought strengthened by the presence of the alliaceous odor in rooms papered with the arsenical hangings. Basedow, a Prussian chemist of distinction, published similar opinions, the source of danger being attributed by him to the development, under the influence of moisture, of a certain amount of arseniuretted hydrogen. Other observers have adopted similar views, advocating the theory of gaseous decomposition, either from the presence of moisture,* or from slow combustion (" eremacaucis ") of the organic elements contained in the paper or in its pigment,† or from the presence in the room of illuminating gas which escapes in small amount and reacts on the arsenite of copper to produce arseniuretted hydrogen.‡

All these theories of the evolution of a poisonous gas are to be distinguished from the absolutely untenable notion which was at one time accepted popularly, namely, that the poisoning took place by the inhalation of volatile arsenical fumes which escaped from the paper. This idea is obviously fallacious, since arsenic is volatilized and evolves " fumes " at a temperature of 360° Fahr., 150° above the boiling point of water.

These hypotheses are not accepted by the majority of chemists at the present day. It is the general belief that the poison escapes from the paper into the atmosphere in the form of dust, mechanically disengaged. This view seems not unreasonable in consideration of the composition of the paper and of the methods employed to engage the pigment in position. The connection between the paper and its color, at the beginning depending only on the adhesiveness of size, certainly does not grow stronger with age. The paper is applied to the wall when moist with the paste or glue of the paper-hanger, and the size surrenders in this process something of its adhesive property. Varying states of the atmosphere, as they regard moisture and dryness, still farther carry on the change by which, with alternate drying and wetting, the pigment is less and less securely held. So that any mechanical violence, however small,—the action of drafts of air, or the passing of a duster, or vibration,—serves to disengage an impalpable powder containing the poisonous agent. It is well known that in the most unused room the air contains a certain amount of dust, so that a single sunbeam let into such a room when it is darkened reveals a perfect cloud of flying particles whose origin no one can tell. It is easy to see how the loosely adherent arsenical powder on the wall-paper of such a room may constitute a part of this dust and the atmosphere become charged in greater or less degree with the pernicious agent. One element in the vexed problem of the relation of dust and disease thus finds solution.

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* Otto Mohr. † John Taylor. ‡ C. T. Jackson,

This view has receives confirmation in the fact that the dust resting on the furniture and mantels of such rooms has been tested and has been found to contain the arsenic in considerable amount. Such an experiment is reported by Prof. Taylor as follows:—

> "A friend whose library walls were covered with an arsenical-green paper had suffered for some time from chronic inflammation of the eyes, especially affecting the conjunctivæ of the eye-lids. On the discovery that arsenic was contained in the green pigment of this paper in rather large amount, he caused it to be removed during the summer and replaced by another containing no arsenic. The inflammation from which he had suffered disappeared, but late in the autumn following it returned. He informed me that he had been dusting some books in a book-case belonging to this room, and he imagined that the dust which had accumulated for two or three years had affected his eyes and had caused a return of the inflammation. Some of the dust was carefully removed from the tops of a few books by a feather and submitted to chemical analysis. The dust weighed one grain and a half; it had an olive-green color and under the microscope it presented the appearance of fibres, with numerous particles of various colors, chiefly of a grayish-black. A portion of the dust yielded a deposit of arsenic by Reinsch's test and there was, therefore, clear evidence that some of the mineral arsenical pigment, formerly on the walls, had found its way through the glass doors of the book-case and had been deposited in the form of fine dust on the tops of the books."*

Prof. Taylor carried his researches still farther in this direction, and tested other dust, collected in a similar manner in the closed cases of a room papered with unglazed arsenical paper, and obtained essentially the same results. These instances, taken in connection with that of Dr. Hinds, cited above, appear to demonstrate that the poisonous pigment escapes from the paper into the atmosphere, and is inspired in substance by the occupants of the room thus contaminated. The poison thus inhaled enters the system through the lungs, or, by local action, produces the symptoms before described.

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* Med. Times and Gazette, Jan. 1, 1859.

A third class of observers, including M. Kirchgässer of Coblentz and M. Chevallier, accept both these theories and allow a dual toxical influence. They admit all that is claimed for the dust hypothesis, but believe also, in view of the occasional detection of the odor of garlic or of mustiness in the suspected rooms, that under certain conditions of moisture a gas is generated, poisonous in character, which escapes to infect the air.

Who are the victims of the unnecessary, yet too common, practice of covering the walls of rooms with poisonous paper? It is obvious that everybody exposed to the influence in question is not affected, even to a moderate degree. No positive criterion can be established, indeed, since the conditions of exposure are so varied and complicated. It cannot be said of a sample of wall-paper with a stated amount of arsenic on its surface, that when laid on the wall of a room it will produce a regular series of symptoms in the persons occupying the room a given length of time. Other things being equal, the persons whom habit or occupation keeps much within doors would be most likely to suffer, and we should look for most numerous cases among women and young children. But, in point of fact, we find a great diversity of susceptibility. Among those who are even exposed continuously to the action of the poison, there occur instances of immunity. Such a case is cited by Dr. Guy:—

> "I have myself known an instance of a spacious day and night nursery opening into each other and covered with a flowered paper rich in emerald green, occupied for several months together by nurses and children, and yet without, in any way, affecting the health of the inmates. The poison in this case was so loosely laid on that it deeply stained a white handkerchief rubbed over it. This case is the more striking as it occurred in the house of a physician well acquainted with the effects of the poison and quite alive to their detection." *

But these negative cases are important only as showing the tolerance of a poison by the human system, and they do not

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* Report of Med. Officer, Privy Council, *loco citato*, p. 135.

annul the force of such testimony as has been quoted. It is a fact well recognized by physicians that different organisms vary exceedingly in their susceptibility to the action of drugs, and this idiosyncrasy will explain much of the diversity of effects observed in connection with the mode of chronic arsenical poisoning we are studying. An agent which is comparatively inert as regards one organism is to another an active poison. But because, for example, the poisonous ivy is to some persons harmless, or because certain people in Styria can swallow pure arsenic and appear to thrive upon it, there will yet be few of us who, knowing the possible results to ourselves in the one case or the other, would be quite willing to purposely test our own powers of tolerance. It is hardly justifiable, therefore, to put children to sleep in an atmosphere charged even slightly with arsenic, voluntarily trusting to the chances that such an exposure will be harmless.

When to this consideration of susceptibility are added other conditions, such as the previous health of persons, the degree of exposure (depending, primarily, on the amount and tenacity of the arsenic in the paper and indirectly on attention to ventilation), or the eliminating power of the system, it will be seen how many circumstances influence the effect of the poison. Few will be found who, with any knowledge of the facts, will insist that a mineral agent which is capable, almost invariably, of producing well-recognized effects when taken into the stomach, is as invariably incapable of harm when it is more indirectly absorbed by the system through the mucous membrane of the respiratory organs; and few will be ready to take on themselves the voluntary risk of testing the question in their own persons by habitually dwelling in arsenical rooms, or will think it advisable that any human being should breathe the poisoned air of such rooms, even admitting that a portion of mankind is, in this respect, arsenic-proof.

The idea readily suggests itself that if such effects as those described are to be observed in the occupants of rooms, decorated with green paper, we ought certainly to discover some influence on the health of workmen who are exposed to the action of the arsenical pigments in the practice of their trades; and we should look for positive testimony from those engaged in the manufacture of the paper-hangings and from those who put the papers on the walls of rooms. And evidence of this kind is not wanting. The investigations of Chevallier, of Pietra-Santa, of Dr. Guy and others show that a distinctive train of symptoms appears in those habitually engaged in making arsenical papers, and that these symptoms are referable to the arsenic in the pigment. According to these authorities, they are not unlike those already enumerated as observable in the occupants of arsenical rooms; they consist of thirst, nausea and vomiting, pain in the stomach and bowels, great prostration, disturbances of digestion, drowsiness, headache, nervous tremblings, and (traceable more directly to the local action of the arsenic) sore-throat and irritation of the mucous membrane of the nose and mouth, showing itself in sneezing, a mucous or bloody discharge and swelling of the lips. Coincident with these is the appearance sometimes of various eruptions on exposed parts of the body, as the hands and face. These eruptions are sometimes mere pimples, sometimes they resemble erysipelas (erythematous), and sometimes they develop to ulcerations whose favorite seat is in the folds of the fingers and about the roots of the nails, where the pigment would be most likely to make a more or less permanent lodgment. These symptoms manifest themselves with a severity and uniformity in proportion to the degree, length and continuity of exposure, to the workman's neglect of cleanliness, and to individual susceptibility to the poison; and they disappear spontaneously when the work in green colors is discontinued.

The personal researches of the writer verify many of these observations. A visit was made, in August, 1871, to one of the largest manufactories of wall-paper in New England, and facilities were afforded to witness all the processes. Workmen were seen engaged in making the colors, in mixing them with size preparatory to printing, in laying on the ground-pigment and in printing in colors. The building was not inferior to others of its class, and ample provision appeared to have been made for light and ventilation. In making the green pigment, arsenic was used by the barrel. A number of the workmen were asked whether they had observed any effects from their exposure to the pigments which they used. Their replies showed that, either from their own personal experience or by common consent, the emerald-green colors had a bad name; and in a few instances arsenic was mentioned as the recognized agent which caused the harm. A foreman in the color-room, where the pigments were mixed with warm size, stated that putting the hands and forearms into the green color, as was the frequent practice in order to hasten the process of mixing, produced in a short time "sores on the hands"; and that the workmen, recognizing this, changed work frequently. Another, a workman, said he had had the ulcers, but he thought they might be avoided by careful attention to washing; he considered that there was little danger, however, if the skin of the hands was unbroken, the color acting much more quickly on cuts or abrasions. One man, aged about fifty years, who at the time of the visit was at work in the "bronzing room," stated that he had been employed in the business twenty-three years, and had been engaged in various departments. He had himself suffered from the ill effects of emerald green and had observed them in others. He considered the pigment a poison and that its influence was worse when it was used dry. After working with the color a fortnight or less, the symptoms generally manifested themselves, commencing like the onset of a bad cold in the head: there was headache and a foul discharge from the nose; the lips and nose swelled; there was salivation "as bad as from mercury," nausea and a feeling of illness in general. At the same time the genitals were swollen so that walking was attended with difficulty. Ulcers, also, appeared on the hands. These symptoms gradually disappeared within a fortnight after the work was discontinued.

Many paper-hangers, likewise, recognize the fact that certain green papers have a tendency to develop a peculiar set of symptoms in those engaged in fitting and hanging the paper on the walls of dwellings. These symptoms are of an acute character, manifesting themselves without delay and giving evidence of a local effect. They resemble in many respects those which characterize the beginning of an ordinary "cold in the head," and consist of sneezing, irritation of the eyes and nostrils, headache, and swelling of the lips; in the more severe forms of poisoning, there is vomiting with diarrhœa and an indescribable feeling of illness. Many cases of this kind have been reported from time to time, and some instances are recorded in which the paper-hangers have asserted that they never could work upon certain green papers without being made seriously ill. In the course of this investigation, the writer has obtained information from paper-hangers which in many respects corroborated the observations recorded. Of nine of these men who were seen, seven had been poisoned by the arsenical wall-paper with various degrees of severity; the two negative cases were those of men who had not been long engaged in the business. Of the seven instances, one was especially marked. Within twelve hours after working upon a paper whose pigment was loosely laid on, the symptoms of poisoning showed themselves; there was irritation of the mucous membrane of the eyes, nose and mouth accompanied with great prostration of strength; presently, an eczematous eruption appeared on the hands and extended to other parts of the body. The illness was so severe as to necessitate entire suspension of his work, and he entered the hospital for treatment.

In the other cases, the symptoms were less serious, but they were sufficiently characteristic. Immediately consequent upon the work with the emerald-green papers, and disappearing within a week after the exposure ceased, the effects before described were experienced,—inflammation of the eyes (conjunctivitis), swelling of the nose with a mucous discharge, ulcerations about the nostrils, headache, sore lips and sometimes bleeding from the nose.

The following instance has incidentally come to the writer's notice. Mr. W., a young man of robust constitution, a salesman in a paper-hangings store, complained of nausea, diarrhœa, great lassitude, inflammation of the conjunctiva, mucous discharge from the nose, and occasional dizziness. The symptoms could be explained by no unusual excess or exposure, and nothing was elicited to which his condition could be attributed save the fact that during the month previous he had exhibited to customers more patterns of arsenical-green paper than usual.

To these statements concerning the ill effects experienced by workmen, exception will be taken by some and especially by those interested in the manufacture and sale of paper-hangings, on the ground that none of the alleged injuries have occurred under their observation. It may readily be seen that, notwithstanding its apparent partiality, such negative testimony might be given in all sincerity. The symptoms described are such as would naturally be referred to other causes; they are, in a measure, obscure; they occur with exceptional severity and they do not terminate fatally; they do not generally interfere with the performance of duty, and a workman would not be likely to complain of a condition of things of whose real character he had no certain knowledge, especially when he was dependent on his occupation for a livelihood.

This study of the employment of the arsenical-green pigments in various arts and of the manifold noxious effects which directly or indirectly result suggests, in conclusion, the consideration of some remedy for what we must term an evil. There will, of course, be those who will hesitate to condemn this use of arsenic and who will hardly be ready to denominate it an evil. To those, for example, who regard fatality, the aggregate number of deaths, as the test by which the fruits of an alleged abuse are to be relatively judged, this whole inquiry will appear unnecessary, perhaps unjustifiable.

Not so do those reason who have themselves observed the ill consequences of too great trust in color, or who have experienced those effects in their own persons. Those who realize that seriously impaired health does, in a certain number of cases, surely result from the employment of an active poison in the composition of a color whose sole purpose is as a luxury to gratify the sense of vision and which has not the smallest claim as a necessity, feel that an emphatic word of warning is imperative. It is to be remembered that the arsenical colors are poisons scarcely less active than the agent which gives them their name; and being colors simply, a single unequivocal instance of injury justifies their condemnation without the need of waiting until people are habitually killed by them.

Many suggestions have been made with the view to the protection of people from the harmful effects resulting from the arsenical greens. For example, the green wall-papers are to be covered with a layer of varnish; the workmen are to be specially instructed with regard to cleanliness; and so on. At best, these are but compromises and a partial remedy; and were it carried out as fully as practicable there would still be abundant exposure. If the use of arsenic in the relations we have studied is an evil, it is an absolute evil, concerning which the public may well be informed, for "the people perish for lack of knowledge" of the risks to which they unconsciously expose themselves in the means they take to gratify a refined taste for the beautiful.

It is questionable whether in our own community such a knowledge is not itself the best remedy that can be suggested. In other countries, in which the machinery of government is capable of rigidly executing the laws which are enacted in behalf of the public welfare, legislative restrictions are practicable; and Germany, France and Sweden have stringently regulated the traffic in the arsenical colors. Such repressive legislation would be difficult in a society and under a government organized like our own. The rights of individuals and of industrial pursuits are deemed too sacred to allow of excessive restriction, and a prohibitory law to affect the manufacture or use of arsenical pigments would be of questionable force.

If, however, there can be awakened in the community some appreciation of the dangers which belong to the indiscriminate use of emerald-green colors, there will be no need to invent methods of repression in behalf of the public health; for reasonable people, informed concerning the risks, will not be likely to test their own tolerance of arsenic or to subject their children to it. The demand ceasing, the supply will cease; and a correct taste in color will find its gratification in agents which possess no poisonous character.

MILL-DAMS AND OTHER WATER OBSTRUCTIONS.

By the Secretary.

MILL-DAMS AND OTHER WATER OBSTRUCTIONS.

It may be regarded as an axiom of sanitary science that both air and water require incessant movement. Nature provides that these two great agencies for the maintenance of health shall be constantly supplied in a condition of purity. Man corrupts them and is in turn corrupted. Both deteriorate when their original condition of freedom is interfered with by human contrivances.

We are not to expect in the midst of civilization, with all the complications which man's industry has woven about us, that water obstructions can be avoided. They contribute in fact to the wealth and prosperity, and therefore indirectly to the health, of the people. But it is well that we should remember also that they are of themselves, and directly, in a greater or less degree harmful, by putting checks on nature's plan of water-purification. There will never be wanting advocates of any application of natural forces which may lead to individual or corporate profit, while considerations of public health are always less obvious; and even when plain enough to those who seek them, are of necessity but partially recognized by those with whose interests they conflict. It seems therefore well that attention should be drawn to such injuries as are likely to result from interference with the natural flowage of streams and lakes, and of the ocean.

The uneven surface of Massachusetts is scored in every direction with brooks and rivers which from the earliest settlement of the country have sawed the lumber and ground the corn. Hardly a town in our territory is without its dam and mill; and while thus used, they have done good service to the people. Their benefits have been great and their evils have been infinitely small. But our rural saw-mills and grist-mills are by and by turned to other uses. Wherever a good water-privilege exists there soon spring up various manufactures, requiring many laborers and the greatest economy of the power of the stream. The village becomes a factory-town,—perhaps with a crowded foreign population ; the dam is soon raised, and instead of a free movement of the water, tumbling over the fall in its superabundance as in former days, we find a great reservoir in which it is stored for seasons of drought. The character of the country above such obstructions may thus be greatly changed. If it happens to be flat and level, the inhabitants may find their meadows converted into swamps, their dry homesteads into damp and spongy and half-drowned lands, which will undermine the health of their occupants and kill them by slow degrees. This conversion of dry soil into one which is permanently wet, while it may afford profit to the owner of the dam, may at the same time cause the gradual development of consumption in hundreds of families.

The reservoir itself is a still more frequent cause of ill-health to the dwellers on its banks. In addition to the soil moisture which it occasions, it is very sure to receive the wash and the waste of many people, and a far greater amount of putrescent matter than can be disposed of in water whose flow is obstructed. The movement which is needful for the work of purification being prevented, the result is seen in a pool whose rank vegetable growths indicate the half-hidden impurities on which they are nourished.

In the summer, when free motion of the stream is most needed to rid it of the sewage which it receives from the neighboring inhabitants, it is only drawn upon for mill-power, and for this object every available drop is saved. When in the season of drought and heat the mill-power is at its minimum and the fever-power at its maximum, the reservoir is often entirely emptied and the whole bottom exposed to the influence of the sun's rays. It then becomes evident from the faint and disgusting odor of decaying vegetation, mingled with whatever of human refuse has been added, what dangerous stuff has been fostered in the half stagnant water. Our correspondence of last year showed in how many instances this exposure of reservoirs has preceded an outbreak of typhoid fever.

Such places in our Southern country would be looked upon as likely to give rise to malarious fevers, to intermittents and remittents. In New England they seem associated with typhoid and, as was stated in our report of last year, through influences coming, like those producing periodic fevers, from the earth itself.

We may even find the two forms of fever so mingled as to make the practitioner doubtful with which he has to contend. There is now a debatable ground in the Middle States and in the northern range of Southern States, where a form of fever exists which during the war of the rebellion was known to our Medical Department and officially reported as "typho-malarial," having more or less of the character of both the enteric and periodic affections.

There is reason to believe that the territorial line of division (always ill-defined) between fevers of a continued and of a periodic type is extending northward, and that our immunity from remittents and intermittents is far less complete than in previous generations. Thirty-four years ago Dr. Oliver Wendell Holmes instituted an inquiry among the most experienced physicians of the time in New England, with the purpose of learning what they themselves knew and whatever had come down from their predecessors concerning intermittent fever originating within the field of their practice. The materials thus collected were made the basis of an essay of singular interest, which was published in 1838 as a Boylston Prize Dissertation. It appeared from all the evidence collected by Dr. Holmes that the traces of indigenous intermittents in Massachusetts were, except in a very few places, but scanty. Some cases had been observed within the memory of living men in the Connecticut Valley, at Northampton, Hatfield and Deerfield. Tradition made it probable that soon after the first settlement of that region they were less infrequent. At Groton and Hopkinton and a few other scattered towns, fever and ague had been known to originate during the previous half century. In the valley of the Housatonic, and there alone in Massachusetts, were found distinct records of intermittent fever as a prevailing disease. In Sheffield it had been always known, not only on the banks of the river, but in the vicinity of certain ponds. Some of the letters in which the history of intermittent fever in Southern Berkshire is given speak of the apparent exciting causes as follows: "Mill-dams on the Housatonic and its tributaries, by forcing the water for miles above their location into low grounds, marshes and coves, and thereby producing macerating reservoirs of vegetable substances, cause *foci* of pestiferous exhalations to which intermittents in all their grades and varieties have been obviously traceable." Several instances are mentioned in which dams were built for the purpose of killing the timber by flooding it, during the early settlement of the country, and that purpose was accomplished, but with the additional effect of killing a certain number of people also by fevers.

About the year 1828 a dam was built for obtaining water-power for mechanical purposes on the Housatonic, two or three miles south of the Massachusetts line. It affected the height of water on that sluggish stream for a distance of ten miles, and was followed by such increase of intermittent fever that the people sought and obtained legal authority for the removal of the dam on the ground that its effects on public health were such as to constitute it a public nuisance.

Twenty-five years ago it was taught in our medical schools that intermittent fever was a disease almost unknown in Massachusetts, except when contracted in other places. The opinion of Dr. Nathan Smith concerning the complete immunity from this disease of the Connecticut Valley, in Vermont and New Hampshire, was accepted as the rule for all New England. That there were exceptions was admitted, but they were of great rarity.

The exemption of the people of this State from periodic fevers seems to be far less complete at the present time. Intermittents have been observed in Chelsea, and the history of the cases carefully investigated, and their local origin proved on lands reclaimed from a salt marsh and now covered with houses. Cases have been seen during the past year clearly originating in Boston. They have been reported of late years in various parts of the State, along the banks of streams, in lowlands and also in the immediate vicinity of tide-water, and occurring in persons who had never lived elsewhere. Physicians have also observed that in the treatment of typhoid or enteric fever, the number of cases in which quinine is found useful, not simply as a tonic but as a febrifuge, has become very considerable. In parts of Connecticut, intermittent and even remittent fevers are now not only frequent but severe, and the gradual enlargement of the area of malarious influence from the latitude of Long Island Sound towards the southern border of Massachusetts is a fact to which we may well give heed. In reply to inquiries on this subject, the following information has been received from Dr E. W. Blake of New Haven, who kindly allows us to publish it:—

"*Periodic Fevers in and about New Haven, Conn.*"

"First, a few words as to the topography of New Haven and its vicinity. The city is situated on a level plain, at the head of a harbor, which extends four or five miles from Long Island Sound. The harbor is formed by the confluence of three rivers,—the Quinnepiac, which bounds the city on the east, Mill River, which flows through its eastern section, and West River, which forms a part of its western boundary. Except towards the Sound, hills encompass it, two of which, East and West Rocks, present precipitous fronts of trap, 370 and 400 feet high. The soil is generally gravelly.

"The Quinnepiac flows through extensive meadows, on whose borders at North Haven are extensive clay pits, where are annually made some 30,000,000 bricks. Higher up are Wallingford, Quinnepiac and Meriden.

"Mill River skirts East Rock, flowing through Whitneyville, two miles from New Haven, where it is dammed, forming Whitney Lake, which extends two and a half miles and covers an area of 252 acres. This lake affords the city's water supply. On the river beyond the lake are situated Augurville, Centreville, Ives' Station and Mount Carmel; these places, as likewise Whitneyville and the lake, are within the corporate limits of the town of Hamden.

"West River flows through Westville, a village in the town of New Haven, skirting West Rock, and with its connecting streams and tributary ponds affords sites for various factories.

"In the outskirts of New Haven, are many 'hollows' where water *stands* during wet seasons, making permanent ponds, and others where a slow drying process goes on after every heavy rain.

"Beaver Pond is a peat swamp, commencing in the north-western part of the city, and stretching some two miles into the adjoining town of Hamden. Some sluggish streams run through it, and it contains many stagnant pools.

"Periodic fevers have been occasionally prevalent in New Haven and its vicinity, ever since its first settlement in 1638–39.

"There were a score or two of cases of intermittent fever in New Haven and its immediate neighborhood in the six or seven years which followed 1850; none during the preceding forty years.

"The present epidemic of this disease in the 'New Haven region' first appeared in the summer of 1863. One case in West Haven, some four miles south-west of the city, and two cases on and near Mill River, three miles north of the city. The case in West Haven occurred in a person who lived close to a mill-pond which had been drawn off for repairs. It has prevailed in that locality ever since, spreading more widely each successive year. On Mill River, ten years ago, a dam was rebuilt and greatly raised, and a lake formed (which before was a mill-pond) for supplying the city with water. A large tract of land was flowed, which in dry seasons is laid bare to a large extent. At the head of the lake, close to its edge, occurred the first case of fever in that quarter and that year. The other case was that of a man who resided on high ground, three-quarters of a mile east of the lake. Since then, the disease has returned every season to the present time, being most general in the years 1869, 1870 and 1871. It has been for five or six years generally prevalent at Whitneyville, which lies below and near the dam. In 1867 the fever appeared higher up the river at Augurville, Centreville, Ives' Station and Mount Carmel, all manufacturing villages, with mill-ponds near by, the last-mentioned place being eight or ten miles from the city.

"In 1865, the disease appeared around Beaver Pond, so called, a peat swamp extending two miles north-west from the city. The same year it showed itself on West River at Westville, situated under West Rock, where there are several mill-ponds and factories. From these points it extended into Hamden and the north-west part of the city, in which places it is still prevalent.

"In North Haven, on the Quinnepiac, seven miles north-east of the city, the fever appeared in 1867 on the west side of the river. It was more general in 1868, and still more so in 1869, 1870 and 1871; in the two last years prevailing all over the town and extending up the river to the manufacturing village of Quinnepiac, and finally, during the present year, to Wallingford, twelve miles from New Haven. In Meriden, still higher up on the same river, the disease appeared some two or three years ago and is still rife. It is also prevalent in Cheshire and Southington, the towns lying west of Wallingford and Meriden.

"The city has suffered along its northern, north-eastern, north-western and western borders, more last year than before, and more this year than last. There are a few cases this year in the central parts of the city. It should perhaps be stated here that in many of the streets, the soil has been much disturbed for making road-beds for McAdam pavements, and by deeper excavations for constructing sewers. East Haven, lying on the east side of the harbor and Quinnepiac River, has not escaped, though it has suffered less than any other town near New Haven. With the exception of this fever, the New Haven region is healthy.

"The seasons of 1864–5 were dry; those of 1866, 1867 and 1868 were wet; those of 1869 and 1870, particularly the latter, very dry; the present year has been moderately wet."

Dr. Blake also furnishes the following estimates of the number of cases which have occurred in the past eight years:—

CITIES AND TOWNS.	Population.	Cases of various forms periodic fever.
New Haven,	50,000	1,500
Hamden,	3,500	3,000
Westville,	1,500	1,200
North Haven,	1,800	1,000
Cheshire,	2,500	*
Wallingford,	3,500	*
Southington,	4,300	*
Meriden,	10,500	*
Orange (W. Haven),	2,800	*

"The cases have been of every form and type 'regular, irregular and defective'; the latter covering cases of 'dumb ague' which are very common in the older fever and ague localities. Cases of remittent have also been quite numerous. In many localities whole families have been prostrated with the various forms of this malarious disease; old and young have alike suffered. There have been instances of the closing of factories by their proprietors from this cause."

If, as seems probable from what has been stated, fevers of a periodic type, intermittent and remittent, show a disposition to extend from more southern regions and invade New England, it must be definitely stated that the cause is unknown. Such changes in the territorial limits of diseases of this class are of not infrequent record in history. They prevail for a certain period, pass away, and again return, seemingly in obedience to

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* Of the number of cases in these places there is no reliable information.

some law of wide-spread operation as yet not comprehended.* But if we cannot control the predisposition, if we cannot avert the proclivity to disease in certain forms, which at times seems to exist in great sections of country, observation has pointed out very plainly the special and local circumstances which encourage their development and increase their severity. We know that, in our Southern States, periodic fevers are most frequent and violent on the low lying and wet rice-plantations, and by the side of sluggish streams with a rich vegetation. If the cycle of malarious influence should again come round, if intermittents and remittents should prevail in Masssachusetts as they now do in Connecticut, they need not be looked for on the dry pine-plains, or on the hill-sides, but will surely be found by the sluggish water-courses, in the salt-water marshes, by the side of obstructed streams and reservoirs, and wherever the natural flow of water is so hindered by man's contrivances that the result is stagnation.

But there is another form of water obstruction, which, from special circumstances, is full of danger to the public health, and is counterbalanced by no commensurate claims to economical value. If the fresh-water obstructions need to be watched, some of the salt-water obstructions need to be demolished. If the river dams and reservoirs are liable when used for the single object of profit, to render public health less secure, the tide-mills *in crowded neighborhoods* are nuisances which should be abated.

The rise-and-fall of the tide has been used as a motive power from the earliest settlement of the country. Before the age of steam, it was made available in nearly every town on our coast, where an arm of the sea was sufficiently narrow to allow of the ready construction of a dam. In some instances, very elaborate and expensive works were undertaken, with permanently full and empty basins, so that the power should be continuous. Tide mills have not been found profitable, and but few have been built of late years, but the dams remain, and the water-power is still used to a certain extent. It happens, in many instances, that large cities and towns have grown up immediately around them, and where nobody lived when the water obstruction was first permitted may now be found a crowded population, absolutely requiring, for the maintenance of health, all the fresh air and all the drainage which it is possible to supply under circumstances the most favorable.

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* From the diary of a tutor in Harvard College, in 1683, it would appear that intermittent fever was recognized at that time as occurring in Cambridge and in Salem. See Boston Medical and Surgical Journal, January 26th, 1853.

A striking instance of this form of nuisance, and on an enormous scale, may be seen in the present condition of what was once the receiving basin of the Boston and Roxbury Mill-Dam Corporation, now in process of filling for the streets and houses of the most fashionable part of Boston. This has become a "dead sea" of uncleanness, by reason of the obstruction to the free wash of the tide which is offered by the "Cross Dam." During the summer of 1871 a territory of about seventy acres was thus kept nearly filled with stagnant salt water, the daily ebb and flow being almost entirely prevented for the sake of the power which was thus given to a grist-mill. It has been sometimes said that this half-stagnant water was retained in the basin to prevent the emanations from the mud along its borders at low tide. The answer to such defence is seen by comparison of the two basins from the Cross Dam. In one the tide ebbs and flows freely at all seasons, and there is no offensive odor, although the great Stony Brook sewer empties into it; in the other, the tide is obstructed, and the odor is vile, although it now receives no sewage from any city drain. The wash of the tide during the present winter would probably have rendered occasional exposure of the flats next summer quite inoffensive. There were times during the month of July last when the sickening odor coming from this region was sufficient to drive people from their houses. It certainly affected the health and comfort of at least twenty thousand people, and it is certain to do so again in the coming summer, unless the stagnant condition of the water is relieved. Each year, as the water area is diminished by filling, it will become more offensive from the accumulation of mud impregnated with old sewage being thrust inward as the gravel is unloaded along its border.

Salem has on either side an arm of the sea known as North and South Rivers. Both have been obstructed by dams for a very long period, and both are now nuisances which deprive the neighboring inhabitants of the fresh air which they have an unquestionable right to enjoy, and which public authority should secure to every citizen. Above Frye's Mills, on the North River, the mill-pond is polluted by the drainage from a good many tanneries, and from a thickly settled portion of the town of Peabody. Here is seen on a large scale the kind of fouling to which salt-water mill-ponds are almost certainly exposed in the neighborhood of large towns. The temptation, both on the part of individuals and corporate authorities, to cast into the pool the refuse fluids and solids which must be got rid of, is too strong to be resisted ; and the result is, that the mud in the course of time becomes completely charged with a putrid sediment which contaminates the water, and in hot weather gives off the most offensive odors. The accumulation goes on from year to year, unobserved in winter, but each summer growing more offensive. There can be no doubt that the power of resisting disease of every kind is diminished by habitually breathing air so polluted, that not only the enjoyment but the duration of life is abridged, and that the liability to destructive epidemics is thereby increased.

The remedy in this extreme case of water made putrid above Frye's Mills in Salem and Peabody by both dam obstruction and abundant sewage would not probably be complete by permitting the tide to freely ebb and flow, The constant fouling from the beam-houses is on too great a scale.

The drainage from Peabody must almost necessarily seek this natural basin on its way to the sea, and it seems inevitable that sooner or later the flats should be filled, the dam removed, and a capacious sewer built which may receive the waters of Tapley's and Proctor's brooks, and the liquid waste of the tanneries and of the people on both sides of North River. And the sooner the authorities of Salem and Peabody unite for the accomplishment of this improvement, the better will it be for public health.

Charlestown has an old mill-dam and tide-obstructed basin which also receives a good deal of sewage and is a nuisance without qualification. Passengers on the Eastern, the Boston & Maine and Fitchburg railroads are familiar with its odor as they pass its borders ; but the people of Charlestown Neck are almost constantly exposed to its influence in summer by the prevailing winds of that season, and suffer from its effects. The Charlestown health authorities are endeavoring to arrange for the filling up of this basin, but if they would meanwhile allow the tide free access, summer and winter, it would tend to its purification and greatly diminish the present evil.

At Danvers Port is a similar dam hindering the wash of the tide and so confining the impurities thrown into the basin by the Danvers Gas Works that during the last summer it caused the death (apparently) of every fish, both big and little, and the resulting odor was a subject of just complaint by the residents in its vicinity.

Miller's River, an arm of the sea between East Cambridge and Somerville, is another enormous nuisance in its present condition, rendered so by obstructions to the natural flow of the tide and by the drainage of a low-lying and densely-populated region on its banks. There are also slaughtering establishments where several hundred thousand hogs are annually killed, and their only drainage is into this obstructed pool. Blood and other animal matter may be seen, and in hot weather smelled, all along the banks of Miller's River, and it taints the air which is breathed by thousands. The Boards of Health of Cambridge and Somerville during the past summer presented a petition to the State Board of Health asking their action under the law of 1871, chapter 167, General Statutes, with reference to these slaughter houses; but at the time appointed for a hearing, the complaint was withdrawn.

The great and pressing want in the case of these hog-slaughter houses is *drainage*, and this they could have by the filling up the flats of Miller's River, and the construction of a sewer through the whole length of the basin. The need of this improvement is urgent, and it is greatly to be desired in the interests of health that the cities of Cambridge and Somerville should undertake it without the delay of another year. Meanwhile the obstructions to the flow of the tide do only harm, and render the mud more and more foul.*

All along our coast may be found old mill-dams which are liable to become as objectionable as those we have described. Whenever population crowds upon the banks of the ponds they enclose, they soon become downright nuisances, and should be so regarded by the boards of health of cities and towns.

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* Some of these obstructions have been recently removed by the local health authorities.

ANALYSIS OF THE CORRESPONDENCE

ON THE

Use and Abuse of Intoxicating Drinks throughout the Globe,

WHICH WAS PRESENTED TO THE LEGISLATURE IN 1871:

OR,

INTEMPERANCE AS SEEN IN THE LIGHT OF COSMIC LAW.

BY THE CHAIRMAN.

ANALYSIS OF THE CORRESPONDENCE.

OCTOBER 15, 1871.

To the Members of the Massachusetts State Board of Health.

GENTLEMEN :—In our Second Annual Report is printed a correspondence on the use and abuse of alcoholic stimulants among foreign nations, and a comparison of the same with our own country in this particular. I think this correspondence is unique not only for the extent of the surface of the globe that it embraces, but likewise for the character of our correspondents. Last year, owing to want of time, the letters were printed without comment, except a most imperfect analysis of them.

I have thought that they should receive more attention from us, and that all their essential truths or apparent truths should be sifted out and brought more clearly into view. I have had this end in view while preparing this communication for you.

I cannot perhaps hope to gain the unanimous consent of the Board to all the propositions I may feel justified in laying down after a fair consideration of the various letters. But I trust you will believe that I have endeavored to get at the exact truth.

In commencing the correspondence as your representative I had no other object in view than to get the opinions of able correspondents, most of them either American ambassadors to different courts or consuls from the American government stationed in all the various important countries of the world to which our commerce extends. My questions embraced two main ideas. They were put briefly, because I believed that if I asked a few questions containing seminal principles, I should get ampler responses than if I should ask a greater number, which would necessarily require a longer time and perhaps much study to answer correctly.

The two ideas were, First: to learn the nature and character of the stimulants used (if any were so used) by the inhabitants of countries to which said correspondents were accredited, and the influence of such indulgence on the health and prosperity of the people.

Second: the relative amount of intoxication in said countries compared with that known by such correspondents to exist in the United States.

The papers were sent to thirty-three resident American ambassadors and one hundred and thirty-two consuls and a few other non-official personages and friends whose opinions I knew would be of great value if obtained.

Among these correspondents are many of our most distinguished citizens, some of whom are well known for their eminent intellectual and moral qualities. Usually they have resided for some years in the places from which they write, and are of course generally well acquainted with the habits of the people, not only of the cities from which they reply, but also with those of the people of the districts or countries in which these cities are situated. Most of them write as if they knew well the habits of the people, and also those of our own nation in reference to the use and abuse of stimulating drink. Hence their opinions on that subject are of great value.

Extent of our Correspondence on the Use and Abuse of Stimulants. Cosmic View indicated.

The correspondence virtually embraces the civilized parts of the globe. The letters came from forty-nine different places, *i. e.* from a little more than one-fourth of those to whom the circular was sent, which with three from this country, made fifty-two different "observation stations," so to speak. I admit that this number is too small to allow us to lay down perfectly positive laws in regard to the topics suggested. But while admitting this much, we may, I think, with equal certainty, be allowed to *find some hints* toward the unravelling and establishing of the great laws which govern the vice of drunkenness the world over. The laws of nature are marvellous in their wide-spread and sometimes most hidden influence. Looked at broadly, they seem to govern all incidents, even those apparently most subject to the influence of human caprice.

By the rigor of modern statistical science, we can foretell the number of suicides that will be committed during any season, or part of a season, in any of the great capitals of Europe or of this country. This can be said of most if not all human events. Can we not therefore hope to learn by these widely spread, if not numerous data on intoxication, some of the laws governing this terrible evil of our race? If we can do this, we may be better able to solve that most important question to us of the present hour, viz.: the prevalence of this vice and its treatment in Massachusetts.

The correspondence was begun, in fact, in order to fulfil the law of the State, which requires the Board to report from time to time whatever information it can obtain upon this vast subject.

Analysis of our Correspondence.

This correspondence is distributed as follows:—

From Europe,	28	places.
Asia,	3	"
Africa,	2	"
South America,	6	"
Canada,	1	"
West India Islands,	3	"
Islands of the Atlantic,	3	"
Sandwich Islands (Pacific Ocean),	1	"
Malta (Mediterranean),	1	"
Australia,	1	"
United States,*	3	"
	52	

Love of Stimulants a Human Instinct.

The first deduction we can make from this correspondence is that this appetite for stimulants is one of the strongest of human instincts. It is seen in every nation, in all quarters of the globe. Savage or civilized man alike purchases or makes his appropriate stimulant. Nature seems in fact unbounded in its liberality in this particular. For wherever on the globe he may be, man finds some means for exhilaration or for soothing himself amid the cares and trials that he may meet. Having been made a free agent he is permitted to use or abuse this bounty, and his own tendency to drink. Deeply rooted as any of the human instincts, this tendency may, if unrestrained by conscience, reason and education, bring disaster and often ruin in its train.

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* In this estimate the valuable correspondence from Massachusetts is considered as a unit.

It varies under different Influences, Climate, Race, Fashion, etc.

But the tendency to inordinate indulgence and intoxication seems to vary with varying climatic law; with the character of the race, and according to the fashion or taste that may have been modified by centuries of custom or of law; with the character of the stimulant used; and finally, with the cultivation or non-cultivation of the grape. In other words, this correspondence seems to indicate that intemperance is governed by great cosmic, social and industrial laws. These should all be duly considered in any practical treatment of this vast evil.

I will arrange what I have to say on this part of my subject under the following heads.

1. Intemperance according to isothermal lines.
2. Intemperance according to race.
3. Intemperance according to the character of the stimulant used.
4. Intemperance as influenced by the culture of the grape.

I trust that I shall be able sufficiently to show that each and all have important bearings upon the sacred cause of Temperance in this State. I am convinced that in all efforts here in behalf of that cause, they must be duly weighed, not only by legislators who would enact laws for the prevention of Intemperance, but by the whole people.

Intemperance according to Isothermal Lines.

Our correspondence points to the existence of a great cosmic law which influences the prevalence of intemperance over the entire globe.

Near the equator, where man is constantly subjected to the direct and powerful rays of a vertical sun, and where the human body is as constantly bathed in perspiration and perhaps panting with excessive heat, there seems to be less need of stimulating drinks than in countries farther removed from the equator.

Correspondents assure us that in the tropics intemperance in the use of liquors is very rare. One speaks of it as a "social crime." A man may be a gambler, or the grossest of libertines, and still be received as an equal in polite society, but if guilty of intemperance he loses caste as one who violates one of the sacred laws of social life. Moreover the people of the tropics, when using these strong drinks, *sip* them from small "*liqueur*" glasses, from which it would be impossible to get the long and deep draughts so common in these northern climes.

These may be said to be the characteristics of the drinking customs of nations living between the isothermal lines of 77° Fahrenheit, north and south of the equatorial line of 82° 4′ F.

On the chart they are marked green, and all but two lie between 77° F. north, and 77° F. south.

Proceeding northward, as we know by our European correspondence, and as we may infer also southward over similar tracts of country in the southern hemisphere, viz.: between the isothermal lines of 77° Fahrenheit, and 50°, north and south, we find regions where the grape-vine grows luxuriantly, and each man may, if he choose, have his own vineyard. We know that in Europe these regions are covered by the richest vineyards and that very many kinds of light and but gently stimulating wines are made. These wines are drunk freely by all the inhabitants. In some districts the babes drink them as they would their mother's milk. They are used by young and old.

In Spain some writers declare that wine is more common than water, a fact very easy of belief by any one who has ever driven dry-shod over the bed of one of the noblest of the rivers of Spain. The vine grows on an arid soil, and the grape-juice becomes the universal beverage.

Intemperance while being still quite rare is less disgraceful than at the tropics. We hear nothing of its being a social crime. Occasionally a man will reel staggering home supported by wife and friend on either side. He is mild, and only unduly elated. His excitement bursts out into flashes of drunken wit or joviality. Rarely if ever does he become malicious or cruel. He is "jolly drunk" not "crazy drunk," as men so often are with us, so says one of our most intelligent correspondents. On the chart, these are marked purple, yellow, orange and blue.

Finally we come above the isothermal lines of 50° F. north, and probably south. Over these regions the vine, although it is found wild, is of less luxuriant growth, and the grapes seem less fitted for the making of wine than grapes grown nearer the isothermal line 77°. But whether it be owing to the imperfection of the grape matters but little for our statement, which I believe is true, viz.: that Russia and all the great Scandinavian people, the Anglo-Saxon and Celt of Great Britain, above 50° F., drink deeply and of more fiery liquor, than the men of the South. Instead of simple exhilaration such as is generally seen on the shores of the Adriatic and the vine-clad hills of Southern Germany and Spain, the dwellers along the Baltic and the northern seas drink even to narcotism, and lie in beastly intoxication perchance in the very gutters of many a northern city. All these except one (viz.: Ceylon a British colony) lie above 50° and are marked scarlet and with a cross.

All this information from our correspondents may be condensed into the statement of a general law, which I will now lay down as I deem it shadowed forth by them:

Intemperance prevails the world over, but it is very rare at the equator. The tendency increases according to latitude, becoming more frequent, and more brutal and disastrous in its effects on man and society, as we approach the northern regions.

Cosmic View of Intemperance.

It would seem therefore as if the burning zone of the tropics took from man the desire for intoxication from alcohol, while it induces him to while away the hours under the fumes of opium, tobacco, or of hasheesh, or in the drinking of coffee or of tea. In the central regions of Europe the taste for alcohol increases, and here bounteous nature provides abundant crops of luscious grapes, which serve not only for food, but also afford the mildly stimulating wines which can be used *temperately* by every age, and apparently without evil. If indulged in excessively they will of course produce intoxication, but even that, though a little more frequent than in the tropics, is rarely of that demoniac or narcotic character seen in the North of Europe, and throughout the whole of our own country.

Finally, above the isothermal line of 50° F. north, and when we get into the colder regions of the earth, man dresses in furs, and heats his houses with furnaces. He drinks fiery potions, which give a glow to his system which enables him, as he thinks, to defend himself more easily from the bitter cold climate in which his fate has placed him. The northern babe, by the very fact that he is born amid snows, tends more to fall into intemperate habits than his young peer of the tropics. The passion for drink lies dormant but fiercely threatening the northern youth, while some of his other animal passions are checked by the same influences of climate. The very reverse happens to the youth of the tropics. Heat checks the love of liquor, but stimulates to unbridled licentiousness. All this may seem very frightful, and some may ask, if I attribute so much to climate, how can any one escape? It is not for me to answer the question, but I know of no good reason why, notwithstanding such a question may be asked, the vast influence of climatic law should not be broadly stated,—and a germain statement should not be neglected, viz.: that as we approach the north the vine disappears, or produces a grape less fit for wine, and that, to meet this want of some stimulus, man distils an ardent spirit from grains or roots, which too often proves a curse to himself and to his progeny. For these strong liquids when used intemperately encroach more upon the vital forces of man's nature than do the wines of the central portions of the earth.*

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* I find in Beckwith's "Practical Notes on Wine" (London, 1868) the following quotations: "Prof Liebig writes, 'wine as a restorative, as a means of refreshment when the powers of life are exhausted, as a means of correction and of compensation where misproportion occurs in nutrition and the organism is deranged in its operation, and as a means of protection against transient organic disturbances *is surpassed by no product of nature or art.* * * In the rich cities of the Rhine, wine is the universal medicine for the healthy as well as for the sick, and it is milk to the aged.'" (page 73.)

"Of spirits" he says, "he who drinks them draws a bill, so to speak, on his health, which must always be renewed, because for want of means he cannot take it up. He consumes his capital instead of his interest, and the result is the bankruptcy of his body."

Mr. Druitt (Report on Cheap Wines) says, "It is not only in a medical point of view, but as a friend of sobriety and morals that I venture to advocate the larger use of wine, i. e. pure wine as a beverage." (Beckwith, page 74.)

Climate in America peculiarly stimulating.

In further proof of the influence of climate, and at the same time to give a warning to our people in regard to the use of liquors in America, I may add the well-known fact that Englishmen on arriving at this country find themselves unable to bear the same amount of liquor of any kind that they have always used with impunity in Europe. The peculiarly stimulating nature of our climate excites the nervous system so much that we should endeavor to be *more* temperate in this country than the nations living in Europe between the same isothermal lines need to be. The following curious facts illustrative of this statement I had from an intelligent physician in this neighborhood:—

Two Englishmen were travelling at their ease through New England, and continued the same amount of stimulants they had always used. They were quite astonished when after a three months' trip they were both about the same time seized with an attack of delirium tremens, which had never afflicted them in England.*

Similar but exactly opposite results have been noticed by Americans when visiting Europe. Many a total abstinence man in America has been led while in Europe to use the mild wines of those regions in moderate measure, but as a common beverage at his dinner, and this with decided advantage to his general health. On his return to this country he is often either unable to use similar wines, or he has no desire for them.

Intemperance as influenced by Race.

From what I have heretofore stated it seems that a child born in England or in any country above 50° F. is by that very fact more in danger of falling into intemperance than one born in Spain or Italy or on a spot still nearer to the equator.

But in addition to this powerful climatic law each nation seems to have its own peculiar tastes in the choice of stimulating drinks. Each one also is now perhaps suffering or is benefited by these tastes as influenced by customs or fostered by fashion or by bad or good laws. The Scotchman of the present hour drinks his strong whiskey, poetically styled his "Mountain Dew." The Hollander grows duller and more sluggish with his gin. Drunkenness and crime follow in the train of these two liquors. The volatile Italian and Spaniard drink their mild native wines as freely as they do their mother's milk. Neither of these becomes a nuisance to themselves or to others by beastly intoxication. The Frenchman and the people of some Swiss countries are, if we may trust to recent academic* discussions, giving up the unadulterated juice of the grape, and are being undermined in health and morals by the powerful but seductive stimulus of brandy, absinthe, or of Schnapps.

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* For curious differences of climatic effect on the nervous system in California, New England and Great Britain, see Dr. Tyler's statement, Appendix, 13.

The excitable Irishman *swallows rapidly* his strong whiskey containing often more than fifty per cent. of alcohol. Even in small quantities this stirs up his combative qualities; or if perchance the shillelah is brandished at some "vanity fair" as a matter of pure "fun!", it is often wielded so formidably that his neighbor's head is as readily broken as when the weapon is swung in the deadly fight.

On the contrary, the naturally sedate German *drinks slowly* in beer saloons and, amid clouds of tobacco smoke, from huge Lutheran cups, his favorite lager beer containing about six per cent. of alcohol. He may become merry or he may become dull, but he rarely if ever fights.† The American Republic, though broadly British in its origin, and therefore inheriting British tastes for strong liquors, has become by immigration truly cosmopolitan. For more than a century men from every country have taken refuge here and have brought their national habits with them. America in her fertility of resources has increased this love of strong liquor. "American drinks," with all their grotesque nicknames, are fast becoming bye-words for the confirmed sots or the youthful devotees to drunkenness throughout Europe. The native American, I regret to say, tends rather to the Celtic than to the German habits of drinking.

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* See recent debates in the French Academy of Medicine.

† In continuation of this subject and for curious details relative to Russia, Sweden, Norway, Australia, Feejee Islands, Kamtschatka and West Indies, see Appendix, 6, 7, 8, 10, 11, 12.

Races are educated to use Strong Liquors by Bad Laws and by other Influences.

That races may be so educated by evil legislation and by other influences in this matter of using intoxicating drinks we have a singularly interesting example in the *present* condition of England. The country has been educated in its tastes for strong liquors to a higher degree than mere climatic law would have carried it. Bad legislation and wars, especially between England and France, have been the agencies that have been at work.

The Romans when they had possession of the country cultivated vineyards, and they flourished well in the south of England. After the overthrow of the Roman power and during the disturbed times of the early and more modern history, grape culture was neglected.

Alfred the Great, in the ninth century, wisely ordered its renewal, and brought over to England foreign fruit-growers. At the time of the Norman Conquest vineyards were found in many of the warm and fruitful valleys where the cloistered monks had built their abbeys. Vine Street at Westminster still points to the royal vineyard of those days and near by and under the protection of royal and knightly castles vines were grown and wines made.

But as the climate of England was not so favorable as that of France for grape culture large quantities of wine were imported in the tenth and eleventh centuries. In 1373, according to Froissart, no less than two hundred ships went annually to Bordeaux in the wine trade.* Similar statements in regard to the foreign cultivation of the grape in England are found at page 470 of Sir Edward Barry's singularly interesting work.† It would be fortunate for England if matters had not been materially changed from this.

An author ‡ who has studied the subject writes as follows :—

"Down to the time of the Revolution of 1688 great quantities of

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* Geschichte des Weins und der Trinkgelage—Ein Beitrag zur allgemeinen Kultur und Sittengeschichte nach den besten Quellen bearbeitet und populär dargestellt für das deutsche Volk, Von Rudolf Schultze. Berlin, 1867, p. 82, &c.

† Observations Historical, Critical and Medical on the Wines of the Ancients, etc.; by Sir Edward Barry, Bar. London, 1775.

‡ Wines and Wine Countries, etc., by Charles Tovey. London: Hamilton Adams & Co., 1862.

French wines were imported to the extent, in some years, of 20,000 tons. The jealousy toward everything French after that time induced the laying on of enormous duties by the legislature." (p. 53.) In 1703 by the treaty of Methuen they practically excluded the light wines of France, and the English were forced much against their will to seek in Portugal the strongly fortified port. (p. 56.) This has been unfavorable to the moral status of England. For the long-continued use of the coarse and rough vintage of Portugal, made additionally so by the addition of spirit, caused the relish for light and delicate wines to decline in England." (p. 57.)

The writer hopes for much good from the recent treaties brought about by Napoleon the Third and Mr. Cobden. Already the use of claret is becoming very common and stronger beverages are less used.

In the work above cited, I also find the following quotation from a speech made by the present prime minister, Mr. Gladstone, in 1861, when alluding to the same fact (page 18) :—

"The taste for wine in England is materially connected with the course of our politics and the revolution of 1688, but still more the Hanoverian succession and our wars with France contributed greatly to alter the taste of the country, so that those who before loved light wines began to love sherry wines. I believe it is on record, that the University of Oxford petitioned Parliament against the grievance of laying heavy duties on light wines, and compelling them to drink port."*

I quote these passages, 1st: to prove that we in the north of this country, coming as we do chiefly of the British stock, not only have the same climatic law that prevails above 50° F., but that we likewise inherit this taste for strong drinks as fostered by English folly.

2d: as a warning to our people. By our present unwise and high tariff on the mild wines of Europe, the people of this country are led to use the only drinks provided for them, viz.: the coarser liquors. Are we not, in so doing, following exactly in the absurd way, I do not say wicked example, set by England two centuries ago? The civilization of monarchial Britain of the 17th century governs in fact Republican America of the 19th. God grant that we may take warning in due season.

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* Macaulay (History of England Vol. 4, 235) states that in 1648 wine was given up from hospitable homes and punch put in its place, and worse than the change of brandy and lemonade for claret, was the increase of crime in 1692. Like causes produce like effects, and as in England during the 17th century, so it is now in the 19th century in America. We shut out light wines and beers of the same class, and instead thereof we have whiskey without stint.

Intemperance influenced by Fashion.

There can be no doubt that the custom of having liquor openly displayed upon the "sideboards" of our ancestors, and the correlative custom of inviting every visitor to "take a glass" with the host, was in former times a source of unmitigated evil. It often terminated in exciting to gross habits of intemperance on the part of the host and of the guest. Especially was the latter too often the victim, if he happened to be of a profession like a physician that required a daily round of visits. He might begin his circuit with mind bright and clear, but he concluded it in a very different condition. As these *private* "*bars*" have been, by fashion closed, we may hope fashion will, at some future time, consider him that keeps an *open public bar* as much out of the pale of decent society as any estate holder, who should revive this custom of olden time to which I now refer.

Some of our foreign correspondence allude to the evil custom we have in America of "treating" one's acquaintance to a "drink" at any hour of the day. They speak of it as most deleterious, and as not existing in the countries where they reside. In fact, I believe that the custom of pledging friendship in flowing cups of "grog," is almost peculiar to this country. It is a curious fact, moreover, that this fashion becomes more and more dictatorial as one proceeeds southward in the United States. In some places in our southern country, to refuse to muddle one's brains with liquor, to be drunk at an open bar at the invitation of a friend, is among the grossest of insults!

Fashion thus overides, for a time at least, all climatic laws.

Open Dram Shops an unmitigated Evil.

Every one, I think, will admit that among the most pernicious customs of this country is the support given by the community to open dram shops, where the coarser liquors are exposed for sale to all comers. It is the *great evil of our country.* Our correspondents give us important information on this subject.

They are open at St. Croix (tropics), but the people there drink liquor in small quantities. "Twenty years ago they were frequent at Frankfort in Germany. Brandy was drunk freely. Of late years in *consequence of improvement in beer, and the introduction of coffee, these shops have nearly wholly disappeared, and intoxication has decreased.*" "Drunkards have disappeared" (page 285 Report). There is no doubt, whatever, that to devise some way whereby such shops could be, with the unanimous consent of the people, effectually closed in our country would be of the greatest moral, physical and pecuniary benefit to the nation.

I recently had a conversation with a German keeper of a lager-beer saloon. Although, in the eyes of some of our temperance friends, we should not expect much wisdom from such a source, I got matter so full of common sense, that I will give the substance of it :—

"Your dram shops for the sale of whiskey and strong liquors are very bad for the people, besides being very expensive. A young man enters one of them intending to take only *one* glass of whiskey. He meets friends and asks them to 'take a glass' with him. In so doing he *pays* perhaps *three or four times* as much as he originally intended.

"The liquor immediately and rapidly swallowed flies into his head. But his companions to return the compliment, perhaps in turn, ask him to drink with each one of them, and then he falls into a still greater difficulty. For he loses wholly his head, after having previously spent more money than he intended. The loss of a whole day of work, and perhaps an arrest for drunkenness with entanglement in the law, and a fine or imprisonment, may very probably be the result.

"The Germans do not have such a custom in their lager-beer saloons. A German may be drinking his beer as his friend enters and he passes his own mug to him to drink from. His friend sips and courtesy is satisfied. Then both sit down, perhaps at the same table, and *slowly drink* a large quantity of lager-beer. Doubtless they both become merry, and German songs may be the result, but rarely, if ever, do the terrible evils follow which so often flow from *one* glass of whiskey when *drank rapidly*, and while standing at one of your open bars."

In fact, as my informant added as a final remark, “Any German who habitually gets intoxicated in the lager-beer saloon, is avoided by the company assembled. They keep away from his table and do not invite him to their own.”

Surely no reasonable man can doubt which of the two customs is the better one, or fail to see how very deleterious our custom must be.

Legislators cannot neglect these great Cosmic and Social Laws.

In all his dealings with intemperance in this country the real statesman *must* consider these primal influences of the climate in which a people lives, and of these tastes of the race. In our country the question is presented in a more complicated form than in any other, from the very fact of the great variety of people that forms our nation. Doubtless this makes legislation more difficult, but that is no reason why a statesman should ignore these great facts.

Crime in consequence of Intoxication.

One of the questions asked our foreign correspondents was the amount of crime caused by intemperance. The following table presents the results of an analysis of their opinions on this question :—

TABLE *showing the relative Amount of Crime consequent on Intoxicating Drinks according to the Temperature of the Places in which the Crime occurred.*

Large Amount.	Isothermal.
Edinburgh, ...	41.50
Dublin, ...	“
Manchester, ...	“
Toronto, ...	“
Berne, ...	50.59
Odessa, ...	“
Rotterdam, ...	“
Utrecht, ...	“
Zurich, ...	“

Medium Amount.	Isothermal.
Copenhagen, ...	41.50
Leipsic, ...	50.59
San Juan del Sur, . .	82.4

Very Little.	Isothermal.
Elsinore, ...	41.50
Frankfort, ...	50.59
Japan, ...	“
Trieste, ...	“
Athens, ...	59.68
Cadiz, ...	“
Fayal, ...	“
Funchal, ...	“
Italy, ...	“
Beyroot, ...	“
Lima, ...	68 74
Pernambuco, ...	77.82
St. Croix, ...	“
Cape Haytien	“
Trinidad de Cuba, . .	“
Zanzibar, ...	“

TABLE—*Continued.*

Among Foreigners (chiefly American-English).	Isothermal.		Isothermal.
Trieste,	50 59	Nicaragua,	77.82
Beyroot,	59.68	Pernambuco,	"
Malta,	"	*Increase since Using Spirits (arrack).*	
Athens,	"		Isothermal.
Cadiz,	"	Ceylon,	77.82
Constantinople,	"	*Due to Spirit, not to Wine.*	
Egypt,	68.77		Isothermal.
Lima,	"	Italy,	59.68

A glance at this table reveals the fact that where the temperature indicates a colder region, and, consequent on the above-named climatic law, where *ardent spirits* are used to the exclusion of milder stimulants, there crime in consequence of intoxication is more prevalent. Even the apparent exceptions to this statement admit of explanation, and seem to prove only the over-powering influence of race or of the religion prevailing in the place, or that a mild stimulant is used.

For example, Elsinore in the North, between (41.50) and Ceylon at the equator, (77.50), have some peculiarities which at first sight seem to render them exceptions. In reference to Elsinore, our correspondent states that the people are remarkably peaceable and orderly, having no rowdyism in the streets. "The police magistrate states that no cases of murder, homicide or theft which have been brought before him could be traced to the influence of drink."

"Arrests for street disorder are very rare among the inhabitants, and chiefly confined to foreign seamen."

But a very important point, as we shall hereafter see, is the fact, that a "mild, very thin and weak" beer, ranging in price from one to four cents per bottle is drunk, averaging about twenty gallons annually to each head of the population. "This large annual consumption does not seem to have an injurious effect on the health of the people,"—as they are a strong, hardy race and "with an average duration of life greater than in the United States." With this mild beverage a little less than one-quarter of the same amount of corn brandy is also drunk. The mild beer is evidently the favorite beverage of the people.

In the case of Ceylon, we have only to know that the island has been governed by the English race since 1815, having been previously under the Dutch, and that by the habits of these two races the island has been overshadowed. The same results have come out on a grander scale in America from similar colonization. In Ceylon the habits of race have overrun all climatic law. Palm toddy and arrack are everywhere used, and the right to distil the latter is a source of revenue to the government. Opium and hemp are added to these stimulants and used by Malays and Hindoos. It would be amusing if it were not sad to read the following final comments from our correspondent. It is so like what is often asserted about similar police matters in various parts of Massachusetts. " Arrack drinking and gambling are at the root of much of the crime committed in Ceylon, and the police, rural and regular, require, to say the least, strict looking after."

It seems to be undoubtedly true that crime in the North is in the vast majority of cases consequent on intoxication. Our Dublin correspondent is especially earnest on this point.*

The following data from the report of the chief of the police of Boston, and the last census report (not yet printed) become very interesting in this connection, if we believe that the Irishmen of Boston do not in one generation change much from the Irishmen of Dublin, and that the habits of the staid German, man or woman do not change much if you transfer them from the neighborhood of the Black Forest to Boston.

The report is given under the title of " Nativity of Prisoners."

The following table made from these two sources shows first, the number in Boston of Irish and Germans; second, the number of each nation; third, the percentage of prisoners to the whole population :—

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* Mr. Justice Lamson in his address to the grand jury at Armagh, 1869, says that "all the crimes we meet on circuit are more or less directly or indirectly caused by drunkenness."

	Population.	No. of Prisoners.	Percentage of Prisoners to the Population.
Irish, ...	56,900	14,673	25.78
German, ...	5,606	364	6.49

The extraordinary difference between the percentages of crime perpetrated by the German and Irish is a peculiar fact, to be interpreted partly by the differences in the temperaments of the two people, but still more I am inclined to believe by the difference in the liquors used by the two. I cannot but think that if the Germans were to drink rum and whiskey as the Irish do, a much larger proportion of crime would be found among them than now, for whiskey does not, so far as I know, affect a German's body differently from an Irishman's body. I would likewise suggest the following proposition: Take away the whiskey from the Irishman and persuade him to use lager beer or Bavarian ale, and perhaps you will take from him a good deal of his pugnacity, and he will be less frequently drunk.

But if we had been unable to get official statistical returns, it must have been evident to every one that whereas an American, or an Irishman is almost daily seen drunk in our streets, a German is very rarely found so. In truth I do not remember to have ever seen a German reeling home intoxicated, or sound asleep on some doorstep, evidently narcotized as the Yankee or Irishman is likely to be by some violent liquor.*

This fact is as above suggested due partly to the different excitability of the races; but still more to the fact that they have been for centuries educated to use two very different kinds of drink.

To sum up all, we may say that two factors enter into the commission of crime consequent on intemperance, as they do into the prevalence of intemperance itself. It appears, 1st: that crime due to drunkenness increases as we go from the equator. 2d: that a mild stimulant used even in the North probably does not lead to crime as stronger liquors do.

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* See Appendix, 4.

Relative Amount of Intoxication in America and Foreign Countries.

The opinions of our correspondents are almost without exception unfavorable to the United States. We have the tastes for intoxication which climatic law and long years of habits of intemperance on the part of our English ancestry have engendered, and all these influences are increased vastly by the stimulating nature of our own American climate—at least that found along the Atlantic slope.

Dublin, Manchester, Ceylon and the Netherlands would seem, with doubtless some others at the North, to vie with America. But in the majority of instances other countries stand vastly higher than we do in their exemption from intoxication.

Are all kinds of Ales, Beer, Rum, and distilled Alcoholic Stimulants to be classed as alike equally and always injurious?

Some writers in this country and in Europe in their zeal for the noble cause of temperance, take the affirmative of this question and claim that alcohol in any form is "*always a poison.*" I cannot hold this opinion, nor do I think that the clinical experience of any physician will admit of it.

The subject is frequently touched upon by our correspondents. Professors Tilamus and Swingar, of Amsterdam, write in favor of abolishing even the moderate use of strong drinks as "always unhealthy" and "against the moral development and material prosperity" of any people, and "as the greatest underminer of the actual welfare of mankind" (p. 345).

The Secretary of the Netherland Society for the abolition of strong drinks, writes that "gin is the beverage of the people and to such an extent as to create a general anxiety about the future of the nation." He adds, "we believe that every drop of alcohol is injurious and the beginning of wilful poisoning." He likewise states that "gin drinking is becoming indecent" (p. 340).

Another correspondent, on the contrary, writes from Trieste (p. 334), that "the drinking of wine and beer is universal." "From infancy to age they (wines) are the common beverage, but are generally, as by Homer's heroes, mixed with water." The same writer admits that on Saturday night a pretty large number of laboring people are "jolly drunk," but not "savage drunk." The latter condition is "unknown"—*save among English or American sailors visiting the port.*

Among the better classes "no instance is known of a merchant, lawyer, physician, shop-keeper, or master mechanic, becoming an inebriate and gradually losing position, prosperity, and business, and sinking into a drunkard's grave." One or more Englishmen and Americans, however, ruin themselves by the use *not of wine but of spirits* (p. 335).

In Ceylon "arrack" (like whiskey) "is an unmitigated evil and ruins many every year." Let it be remembered, however, in this connection, that Ceylon has been for nearly three generations a *British* colony.

In Russia "Vodka" (like our whiskey) drinkers are seen staggering through the streets, "or lying insensible in some corner" (as observable so often in New England). But among the wine tipplers, even when drinking freely, rarely are seen drunkards (p. 301).

Our ambassador from Greece (p. 258), says: "Alcoholic drinks, spirits, rum, &c., are very deleterious in these warm countries. This fact and the comparatively high cost of these stimulants limit their consumption. The light wine of the country, on the contrary, is generally regarded as harmless in its effects, if not positively wholesome, when drunk in moderation." And even when used immoderately it, in some instances, at least, seems to do little harm, if we may trust the story by our correspondent of an old priest, over ninety years old, who had drank twelve bottles per diem for many years. While we must admit that such habits as this Bacchanalian priest had can scarcely be called temperate, it seems to indicate that there is a vast difference between the effects of native mild wines, and our strong distilled alcoholic stimulants. The well known and astonishing infrequency of death from delirium tremens and diseases of the brain in Athens consequent on liquors drank, confirms the above.

Our correspondent, the Hon. John Jay, minister to Austria, entered most warmly into the questions proposed by the Board, and through his influence we procured statistical proof from the Statistical Central Bureau of the Austrian Empire. The facts are terrible and show conclusively that very different effects are produced on the human system by different liquors. It seems that the various species may be arranged in three categories, according to the violence of their effects: First, and mildest, beer and ale. Second, mild, native, "unfortified" wines. Third, ardent spirits, rum, brandy, whiskey, and strongly fortified wines.

Mr. Jay in his letter writes: "I am advised by those in whose judgment I have confidence, that the chief intoxicating drinks in Austria are beer and wine, and that but a small amount of spirituous liquor is consumed excepting in Galicia; that the relative consumption of wine by the people is diminishing, and that of beer is increasing; that the beer in general use is of light kind requiring the consumption of a large amount to stupefy or intoxicate." Among other items quoted by Mr. Jay, is the fact that "each inhabitant of Austria-Hungary expends eight times as much money for spirituous liquors as he does for iron, the most important agent of active industry (p. 307).*

Again, the different provinces of the country show the different effects of the ale, wine, and ardent spirits. Three groups of provinces can be named as varying most. They can be classified according to the liquor most generally used. It is found that the Western Provinces, where beer is most used, stand highest; the wine-consuming Hungarians, are much below them; "while the Galician peasant who ruinously exchanges for brandy his corn before it is ripe and while yet in the pod, is lowest in the scale of industrial development. Indeed the degeneracy of the race in Galicia, although perhaps other agencies may contribute to it, is to be sought mainly in the excessive use of corn-brandy, and thence it comes to pass that out of the men called to military duty in Galicia, 37.9 per cent. are rejected as unserviceable on account of physical disability and infirmity, and 18 per cent. on account of under stature. Accordingly, in all, 55.9 per cent. of those called are unserviceable in the army, while in the entire monarchy 33.5 per cent. are rejected on account of physical disability and infirmity, and only 9.2 for under stature" (p. 308).

Our correspondent at Berne confirms this view by the following statement (p. 263) :—

> "A very intelligent gentleman at Lucerne, a member of the cantonial legislature said 'that some years since he had the charge of enrolling the citizens of that canton subject to military service and

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* Statistical Central Bureau of Austria, from the Minister of the Foreign Office.

was struck with the difference between the people where wine is produced and has always been a common beverage, and those of other districts where wine is not used and schnapps is the common drink. The physical superiority of the former class was, according to his account, very striking and the percentage of able-bodied men in the wine-producing districts very much greater. He attributed the difference in great part, if not to the positive virtues of wine as a beverage, at least to the positive evils produced by schnapps-drinking.'"

Our correspondent, it is true, suggests that soil and generous climate and greater wealth may have had some influence in this result. Whatever may be the various causes contributing to the result, we cannot shut our eyes to the facts brought forward by the Austrian minister, supported as they are by those from Switzerland. To me they seem to confirm what medical experience teaches, that rum and ardent spirit drinkers lower their own vitality, and the children of drunkards are more puny than those of the more temperate.

Ardent Spirits used intemperately Crush out Manliness, and Dwarf a Race.

Thus we get from our correspondents a most shocking array of evidence proving that the free and intemperate use of *ardent spirits* not only crushes out manliness in a man or woman, but actually dwarfs the offspring. The sin of intemperate use of ardent spirits is visited not only upon the third and fourth generation, but must act in all time unless radical reform be instituted. Even if a reform be begun, several generations will be needed to redeem the progeny of such a degenerate race. What a warning this to our country in regard to the use and abuse of *ardent spirits.*

But while admitting this much in regard to the frightful injury to human society arising from the *intemperate* use of "*ardent spirits*," I must still deny wholly the affirmation of the question that it suggests that alcohol is *always a "poison."*

Nevertheless Alcohol is at times needed to save Human Life, or relieve Human Weakness.

I believe that physicians do at times save human life by using various stimulating drinks with the utmost freedom. Moreover I do not believe there is a single article in the materia medica that in its various forms of elixirs, tinctures, extracts, &c., or when simply combined with water, is more necessary than alcohol in the treatment of disease. I know that some excellent friends claim that sometime in the future "good times" something will be found that will supersede the use of alcohol. They hope for this, believing as they do that it is always "a poison." But even while they assert this they use these very poisons in their daily practice. I think there are but very few, if any, who are confident that *they* will ever see the time when they will be able to give up such use.

It is well for us all to deal frankly on this subject. It is time now to look at this question fairly and simply. I take the following position, and I fearlessly assert that clinical experience proves, if it prove anything, that every form of stimulant now in use can be made a blessing, if used temperately and on proper occasions. But I likewise most freely admit that if used intemperately and improperly, each and all may become "poisonous" to the last degree. Yet more, I believe that even when used intemperately, light beer, ale, lager beer, wines like claret, &c., do vastly less harm than the stronger ardent spirits. In truth, the former cannot produce intoxication except after the swallowing of a very large quantity, so large that before intoxication is produced the disposition to drink is satiated, whereas the stronger liquids cannot be taken save in the smallest quantities without danger of intoxication. Moreover, the fact of the habitual and long-continued use of ale and of the milder light wines without manifest evil is not observed in the long-continued use of even small quantities of strong stimulants, such as brandy, rum, whiskey, schnapps, absinthe, &c. Such intemperance with these drinks is *always deleterious.* Man, under the continued influence of the tribe of compositions known in America under the various slang terms of "gin-sling," "cock-tail," "brandy smashes," "mint juleps," "eye-opener," &c., &c., is liable to become at any time a beastly drunkard.

And a man who, knowing this, voluntarily exposes his mind and body to the influence of these ardent spirits, commits an act which, *a priori*, one would deem impossible for any reasonable man voluntarily to perform, any more than he would consent to have himself changed into a chattering fool or a savage brute.

Yet the same amount which produces in ordinary cases such terrific results becomes under other circumstances the wisest and most blessed treatment in some severe diseases. Dr. Anstie* gives the case of a lady who when flooding to death took *a bottle of brandy in two hours*, not only without intoxication but with the single effect of producing sleep for ten hours, but no real intoxication, and life was saved. It was actual food to a bleeding fellow creature starving for want of its own blood.

In a similar manner many persons from their earliest youth, believers in the principle of total abstinence, have at certain times later in life found help in wine or brandy. I have heard that one of the most decided of the temperance men of this community, one who in previous years had persuaded many physicians to assert under their signs manual, that alcohol is not necessary in medicine, became at a later and feebler period of his life a daily *temperate* drinker of brandy. He found it necessary to his daily support. I think I have good grounds for the belief that there are hundreds of persons in this community, especially women, who would be much benefitted if they daily would use light wines or lager beer, and substantial food, instead of the water, or tea, or coffee, and the variety of pies, doughnuts, pickles and cake so common in New England.

There is no doubt that the American people as a whole do not by any means as yet understand the true philosophy of food and drink, and this opinion held by many and which has been the basis of State legislation for years past, viz.: that *all* liquors are in themselves nothing but evil, and equally evil if once taken into the human stomach, proves the truth of this assertion. It is radically and wholly erroneous. Those who claim to be the especial apostles of temperance say that every one who drinks at dinner a glass of sherry or of claret or hock or even of lager beer sets quite as bad an example as the most incorrigible drunkard. In drinking even thus moderately, "temperately," he proves that he does not believe that alcohol under every form and at all times is a "*poison*," and therefore to be absolutely and at all times even in the smallest quantities prohibited.

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*On Stimulants and Narcotics, page 459, by Francis E. Anstie, M. D., M. R., C. P. London: Macmillan & Co., 1864.

Intemperance as it may be hereafter influenced by the Cultivation of the Grape and by the making and using of mild native Wines and of Lager Beer—Grape Culture and Lager Beer in America.

It is the general view presented by our correspondence that in the wine-making districts of Europe intoxication is less frequent and less severe than in our country. Unfortunately we have never *extensively* cultivated the grape with the idea of making wines. Believing in the grape culture as a means of promoting temperance, I know no more melancholy sight than that which our country presents at the present hour in reference to this culture. Although lying exactly within the area capable of growing thousands of vineyards it has, till within comparatively a few years, steadily refused to cover its myriads of unused hillsides with vines. The slopes of our mountain ranges might grow green under vine terraces like those of Europe.

And here I would ask a question full of meaning, as I believe it should be, to all Americans. What would have been the effect on the present condition of our country if two centuries ago we had begun to cultivate widely the grape-vine and had continued to do so until now ? Two benign results I believe would have followed, viz.: we should have been, first, a more temperate people, because we should have used less of whiskey and of its vile adulterations ; and, second, a vast trade, which in a commercial point of view would have been beneficial to our people, would have arisen as it has arisen in corresponding parts of Europe.

Various individual attempts have been made at sundry times to introduce vineyards into America.

Under date of Jan. 25, 1793, and in writing to Albert Galatin, Thomas Jefferson tells of an experiment made on land near Monticello in Virginia by Mr. Mazzie, an Italian.* A subscription of £2,000 was made and vines procured and several laborers imported. His laborers agreed to serve four years. Three years passed when war broke out, and Mr. Mazzie was compelled to let the place. He went to Europe and the horses of his tenant ruined the vineyard. And thus "ended an experiment which from every appearance would in a year or two more have established the practicability of that branch of culture in America." Mr. Jefferson was always a hearty supporter of the doctrine of the value of the grape culture as a temperance measure. In 1818, Dec. 13, when writing to M. de Neuville, he thus expresses himself:—*

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* Works of Thomas Jefferson, Vol. 3, p. 505. Taylor and Maury: Washington, D. C., 1853.

> "I rejoice as a moralist at the prospect of a reduction of the duties on wine by our national legislature.† It is an error to view a tax on that liquor as a tax only on the rich. It is a prohibition of its use to the middling classes of our citizens and a condemnation of them to the poison of whiskey which is desolating their homes.
>
> "No nation is drunken where wine is cheap and none sober where the dearness of wine substitutes ardent spirits as the common beverage.
>
> "It is in truth the only ‡ antidote to the bane of whiskey. Fix but the duty at the rate of other merchandise and we can drink wine here as cheap as we can drink grog, and who will not prefer it? Its extended use will carry health and comfort to a much enlarged circle. Every one in easy circumstances (as the bulk of our citizens are) will prefer it to the poison to which they are now driven by ardent spirits, and the treasury will find that a penny apiece from a dozen is more than a groat from one. This reformation will require time. Our merchants know nothing of the infinite variety of cheap and good wines to be had in Europe and particularly in France, Italy and the Grecian Islands, as they know little of the variety of excellent manufactures and comforts to be had any where out of England. Nor will these things be known nor of course called for here until the native merchants of these countries to whom they are known shall bring them forward, exhibit and vend them at the moderate profits they can afford. This alone will procure their familiarity with us and the preference they merit in competition with corresponding articles now in use."

But why, I ask, should we rest on foreign importations? The vine grows indigenously from far up in Canada down to the Gulf of Mexico and from the Atlantic to the Pacific Coast. Scandinavian adventurers coasting along New England shores centuries ago found the vine in such profusion that they called it "The Good Vineland." Vines grew freely on our hills when New England was first settled. I have already alluded to Mr. Mazzie's experiment under the patronage of Mr. Jefferson near Monticello. But long before that, viz., in 1620, a London company was formed and established a colony in Virginia. But the savages cut off the colonists. The Jesuits had such a successful grape culture in Louisiana that they were ordered by France to discontinue it for fear that it would injure the trade of the mother country.

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* Works, Vol. 7, p. 110.

† See Appendix 5, Letter from Horatio G. Perry, Esq., late Secretary of Legation at Madrid.

‡ Probably Mr. Jefferson knew little or nothing about lager beer.

In 1828 John Adlum published a small volume entitled "A Memoir on the Cultivation of the Grape in America and the Best Mode of Making Wine."*

Its object was most excellent, viz.: to diffuse some practical and useful information throughout the country on the best method of cultivating the native grape and of making wine. He applied to the government for a lease of a portion of the public grounds of Washington for the purpose of forming a vineyard, which would contain specimens of all our native grapes. The writer enters enthusiastically into his subject. He claims that this will eventually be the most profitable article of agriculture in the United States, and he is sure we shall make more wine off the same space of ground than any other country and that there is no reason why every farmer should not have a vineyard as well as an apple or peach orchard; that we have all the latitudes and climates of the best wine countries of Europe; that the wines produced in France are worth more than one hundred and forty millions of dollars annually, and that a similar trade might be had in America. Whether each and all of the positions be absolutely correct I cannot pretend to decide, but it is evident that the neglect mentioned by Mr. Adlum, so far as the *whole* country is concerned, is as true now as when he wrote. Mr. Adlum advises every one having a farm to plant vines, one for every pannel of fence he has around his garden (page 83).†

In 1855 R. H. Phelps published at Hartford a small work entitled "The Vine, its Culture in the United States: Wine-making from Grapes and other Fruits, etc." He speaks of the care with which the culture could be extended, and cuttings sent by mail to all parts of the Union (p. 14), and gives directions for the making of wine. This writer has the following excellent remarks relative to this part of our subject, viz: the bearing of grape culture on temperance (p. 45):—

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* Washington. Printed for the author by William Green, 1828.

† Mr. Adlum mentions the fact that Mr. Jefferson once received two bottles of a wine made by a Mr. A. of the Fox grape, which Mr. Jefferson said "could not be distinguished by company at his table from the far-famed Burgundy named Chambertin" (p. 149).

"Reliable statistics convince us that the importation of wine has fallen far behind the rate of increase of population in England and America while the production and consumption of alcoholic liquor have increased in a most astounding proportion. A writer well posted on the subject remarks:—'In our wine-growing countries where the use of wine is interdicted by extravagant duties the consumption of spirits increases to an alarming degree. England, with a population of 24,000,000, consumes 28,000,000 gallons of spirits, exclusive of porter, ale and beer, while France with a population of 33,000,000, consumes but 15,000,000 gallons of her own brandies and of these a larger proportion is used in manufactures, in fortifying wines for shipment and in the preparation of fruits and confections made only in her own territories. The manufacture of whiskey, spirits and ale for home consumption in the United States amounts to 86,000,000 of gallons annually; this is exclusive of exports!' In regard to the high duties on wine in England, Redding says:—'The enormity of the duty is the cause of the diminished consumption of wine. In 1700 the population of England was 5,475,000 and the wine consumed, a little less than 6,000,000 gallons per annum. In 1851 the population was 17,922,000 while the consumption of wine was only 6,448,517. It is clear that the people of England one hundred and fifty years ago drank three times as much wine, in proportion, as they do now. The natural consequence has been the increased consumption of spirits. From 1730 to 1830 the consumption of British-made spirits increased from 873,000 gallons to 7,730,101, keeping pace with the increase of crime as if not only the temperature of the atmosphere but the amount of misery, pauperism and crime were to be gauged by alcohol. Ireland in, 1821, paid duty only on 2,649,170 gallons of home-made spirits, but in 1828 not less than 9,004,539; *i. e.*, in seven years the amount of spirit made had quadrupled! There were made in England, Ireland and Scotland in the year ending Jan. 5, 1850, 22,962,000 gallons. It is a fact, therefore, however much of an anomaly it may appear, that inebriety in that country has increased with the diminution of wine consumption, and morals, as well as health, have suffered by the same decrease and the augmented use of ardent spirits.' "*

Longworth, of Cincinnati, about 1820, first established permanently the grape culture and wine making in this country. As he did this he felt he was doing a good work for temperance.† And from his efforts the hills of Ohio now resound to the songs of laborers from the Rhine, keeping time to their accustomed work, viz.: upon vine culture and wine making.

Dr. Flagg in his report to the Horticultural Society says‡ (page 48):—

> "I am confident that the introduction of pure light wines as a common beverage will produce a great national and moral reform, one that will be received by our temperance brethren ere long as a national blessing, one that will complete the reformation they have already begun. The temperance cause is rapidly preparing public sentiment for the introduction of pure American wines. * * * Just in proportion as strong drinks are abandoned a more wholesome one will be instituted."

Still more recently California has come into the field, and the vine culture has become a most important branch of industry for that State. It is destined to increase almost indefinitely. The result may not be very apparent yet. Those however who have been longest acquainted with that State, assure me that in their opinion the use of the mild wines is supplanting that of ardent spirits, and that "drunkenness is much less common than formerly."§

Finally, only four years since, a book was published which I deem most important as indicating the great advances we have made in this branch of national industry.||

While admitting that the grape culture is still in its infancy in this country, the author gives important statements on the whole subject. In his preface he says:—

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*The Vine: its Culture in the United States. By R. H. Phelps.

† See Appendix 3, Larz Anderson Esqr.'s Letter.

‡ Phelps as above.

§ Appendix 2, Dr. Morrison's Letter.

|| An Elementary Treatise on American Grape Culture and Wine-making. By Peter B. Mead. New York: Harper and Brothers, 1867.

"Grape culture is fast working itself up to the first position among the productive interests of the country. The capital invested in it may already be counted by millions." "It is safe to say that these products will at no distant day have an important commercial value as respects a foreign trade." "Some of our wines even now sell higher than European wines." "We have no hesitancy in recording our conviction that grape culture may be made the handmaiden of the temperance cause."

I fully agree with all that has been said of the value of light wines as an aid to temperance, but I believe that Germans are destined to be really the greatest benefactors of this country, by bringing to us, if we choose to accept the boon, their lager beer. Lager beer contains less alcohol than any of the native grape wines. This fact with the other fact that the Germans have not the pernicious habits of our people of treating to sharp liquors at open bars, would, if we chose to adopt their customs, tend to diminish intemperance in this country.

What shall we do in Massachusetts to prevent the evil of a too free use of Intoxicating Drinks, and to make our people truly temperate?

If, gentlemen, you have glanced at what has preceded, you will see that if we wish to avoid the manifold evils arising from intemperance we must take strong ground against it, and in favor of radical measures to prevent its prevalence. If it be true that Galicia has stunted the growth of her people by selling its unreaped corn for the whiskey that is to be made of it,—if that nation and Switzerland cannot, in consequence of their use of ardent spirits, produce as many able-bodied men as other nations can,—if the physicians of France, after various academic discussions * of the evils resulting from the use of liquor similar to our whiskeys, rum or brandy, feel called upon to solemnly warn the French nation against the use of absinthe and all that class of intoxicating drinks,—if all these things be true, then surely we should hasten to warn our people. We here are bound by the triple fetters of the laws of climate, of race and of two centuries of habits of intoxication, increased as these have been by wars and by bad legislation.

I would submit therefore the following suggestions naturally prompted by the study I have made on this subject. I hope that at least some of them will prove serviceable to the cause of genuine temperance.

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* See "Every Saturday," Boston, Nov. 25th, 1871.

In all the later efforts made in behalf of temperance it has seemed to me, that in our vain endeavors to gain all we wish by positive law, we have too much ignored the time-honored agencies of education and of moral suasion. We have forgotten that it is impossible in a republic to carry out any law that is unsupported by the deeper sentiments of the people. Unless we can persuade them to believe that a law is just and right and according to the fitness of things, they will not long obey it. The law may be enforced, it is true, in certain instances, much to the detriment it may be of the comfort and of the rights of the individual, but I repeat that no law can be long enforced which is hated and disbelieved in by the people.

On the contrary, I am confident that our people could be gradually led to a higher temperance by appeals to its common sense, while depicting the evils of intemperance, by observing that the use of some liquors is infinitely deleterious, while the "*temperate*" use of others does little or no harm.

We should begin with the young and impress upon them that the use of "*ardent spirits*" tends to burn up their very vitals, and that instead of growing in manly beauty, they and their future children will tend to become a degraded race, and more liable to disease than temperate people are. I would have them see the horribly disgusting nature of intoxication, that state in which man voluntarily gives up all reason and wallows like a pig in his own filth. It would not be necessary to make drunk the Helots of the nation in order to warn our youths, as was done in ancient Sparta. We should only need to show them examples offered daily in all our streets and by-ways, and then warn them to flee from all such abominations. We might carry them to the so-called "sanctities of home" and show them how the home of the drunkard becomes unsanctified. Filled with noisome smells and dirt; the stranger enters and finds both parents wholly incapable of defending their own threshold or their own helpless, starving children. They may perhaps, be spewing upon their own hearthstone in utter irreverence for the idea of what a real home-hearthstone should be. We all, I fear, have been remiss in not doing whatever we can toward educating our youths and maidens to the strictest temperance and to perfect manliness and womanliness in the use of these dangerous drinks.

In our gatherings for festivity have we always been careful not to provide the grossly intoxicating drinks? I fear not. Have we not heard at times of "snug little rooms" where fiery fumes too strong for delicate nostrils are offered to our young men? Do the clubs act wisely in keeping for *common*, *every-day use* the more potent liquors? I think not. Have we in season and out of season at our own tables, urged upon our children the accursed influence of intemperance, and the beauty of a manly temperance in all things? And permit me upon this subject of home education to dilate a little more freely though still very generally. I think there are three modes of educating our young people. Two of these often tend ultimately to produce intemperance in after-life, though founded on wholly opposite views on the subject of the use and abuse of intoxicating drinks. The third one I deem the truest method.

In some families all spirituous liquors, mild wines, and light beer, of every nature are looked upon and prohibited as "*poisons*." The young people grow up under that impression, and are sometimes surprised, when entering upon the more active duties of life, to find that the majority of their young companions have very different views. The previous recluse of domestic life indulges a few times without danger, and then disbelieving the previous parental instructions, which were founded on an untruth, rushes more wildly than he would otherwise have done into unlimited indulgence, with its almost invariable consequence, besotted drunkenness.

In another family the exact reverse of this takes place. Wines and liquors are dispensed freely. Young and old indiscriminately are allowed the free use of them. No cautious words are used, no restraint on the junior members of the house. No warnings are given as to the tendencies to the easy formation of intemperate habits. The youth in such a family is as regularly and as successfully educated to drunkenness as one is educated to any other business.

The golden mean lies between these two extremes. A youth will be less likely to fall into intemperance before whom wine has been, at times, exhibited as a beverage, that may be good for certain times and for certain ages, but which should never be used intemperately by any one or by those not really needing it, or ever by the young, unless as medicine, or under very extraordinary circumstances.

One thus educated is much better able to meet temptation than those who grow into manhood under either of the other fashions.

To sum up all in one word, what we want in Massachusetts to promote a really godly temperance, is *education* in all the causes of intemperance, education in its gross evils. Moral suasion in public and private, of late too much neglected, and by some I fear, despised, should be more thoroughly carried out. This is the foundation of all true action; without it all effort is vain.

Is there no Common Ground upon which all who desire to restrain Intemperance can stand harmoniously?

It is much to be regretted that there is, at present, no common ground of temperance permitted to exist by the ultra defenders of *either* side of this important question. Some desire total abstinence to be the rule. On the other hand, this idea is resisted by many with an energy which threatens to lead to the *opposite* extreme of perfect freedom in the sale of all intoxicating drinks. But the larger proportion of the community, while working and praying for temperance, do nevertheless use and feel they have a perfect right to use wine or ale if not for good companionship, at least, for the reason St. Paul advised Timothy to use it, viz.: for "thy stomach's sake." Under the banner of total abstinence from all stimulating drinks these latter persons cannot stand. They are *temperate* drinkers, and therefore cannot be received as comrades among those who claim to be the only true defenders of the temperance faith. Let us look a little more closely into this subject of intoxicating stimulating articles. Alcohol is not by any means the only stimulus that brings disease and misery on human beings, although perhaps it is a stronger *inducement to crime* than all others.

Were, therefore, a strict rule made that no articles stimulating to the nervous system should be used by the present party of devotees to abstinence, the dogma would split that party into innumerable fragments. It would probably be divided into various small cliques, each excluded for its intemperate use of some favorite stimulus, tobacco, opium, coffee or tea, &c. Scarcely a week passes that I am not called to "*prohibit*," in a particular case, all use of the one or the other of these articles.

There are thousands of what could be happy lives were it not for the "demon of intemperance" in the use of tobacco. Not a few cannot now taste a drop of coffee, because of over-indulgence in earlier life, and often am I obliged to cut off tea from a patient and fall back upon the first drinks given by nature to man, viz.: milk or water. But because I have to do this in the cases of certain men or women, I do not therefore infer that the whole community must wholly give up either of these articles. I know they are very necessary to mankind as a whole. A man *may* be able to smoke his two or three cigars, or chew daily as long as he lives. He may disgust other people by the habit, but he *may* not materially injure himself. Nay, there is no doubt that this wicked weed is, at times, of infinite value to man. For example, our soldiers fought the battles of the late civil war more easily in consequence of the almost universal use of tobacco. It supplies at times the want of food to the hungry, and often, I doubt not, solaced the sufferings of the wounded on the battle-field. But let the miserable condition of many who have used and are still using it inordinately, tell the tale of the evil resulting therefrom. "Give me the choice," said a physician of my acquaintance, who himself had once been a victim to intemperance in the use of tobacco, "give me the choice of which I should prefer for a son, the intemperate use of tobacco or of rum, and I should immediately say, 'let him be a drunkard. Rum is less hurtful than tobacco.'" I quote this as a victim's judgment, not as my own, though I have seen insanity produced, as I believe, by tobacco. Similar evil comes, in some instances, from tea,* coffee, and above all from opium, the use of which I regret to believe is increasing.

As a fitting termination of this part of my subject, I append the following list of various ales, wines and spirits, with the relative amounts of alcohol in each. It is taken chiefly from Brande's Chemistry.

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* For intoxication caused by tea, see Appendix 14.

TABLE *showing the percentages of Alcohol in various Stimulating Drinks, Wines, &c. (Brande's Chemistry. Art., Alcohol.)*

Portuguese Wines.

Port,	contains	14.27 to 25.83	per ct.	of alcohol.
Bucella,		18.49	"	"

Spanish.

Sherry,	contains	13.98 to 23.86	"	"
Malaga,		17.26 to 18.94	"	"

Madeira and Canary Islands.

Madeira,	contains	14.09 to 24.42	"	"
Malmsey,		12.86 to 16.40	"	"

French.

Claret,	contains	12.91 to 17.11	"	"
" 1811, 1st growth,		7.72	"	"
" Chateau Latour,		7.78	"	"
" Vin ordinaire,		8.99	"	"
Champagne,		11.30 to 13.80	"	"
Burgundy,		12.16 to 16.60	"	"
Hermitage,		12.32 to 17.43	"	"
Sauterne,		14.22	"	"
Frontignan,		12.79	"	"

Sicilian and Italian.

Marsala,	contains	18.20 to 26.03	"	"
Lacryma,		19.70	"	"
Falernian,		18.99 to 20.00	"	"

German.

Hocheimer,	contains	8.88 to 14.37	"	"
Johannisberger,		8.71	"	"
Rüdesheimer,		6.90 to 12.22	"	"
Rhenish,		7.00 to 7.58	"	"

Cape.

Cape Madeira,	contains	18.11 to 22.94	"	"
Constantia,		14.50 to 19.75	"	"
Muscat,		18.25	"	"

Hungarian.

Tokay,	contains	9.88	"	"

Persian.

Sheraaz,	contains	12.95 to 19.80	"	"

British.

Grape,	contains	18.11	per ct.	of alcohol.
Raisin,		23.30 to 26.40	"	"
Currant,		20.55	"	"
Gooseberry,		11.84	"	"
Orange,		11.26	"	"
Elder,		8.79	"	"
Mead,		7.32	"	"
Cider,		5.21 to 9.87	"	"
Perry,		7.26	"	"

Malt Liquors.

Ale, Burton,	contains	8.88	"	"
" Edinburgh,		6.22	"	"
" London,		6.20	"	"
Brown Stout,		6.80	"	"
London Porter,		4.20	"	"
" Small Beer,		1.28	"	"
Edinburgh,		5.36 to 7.35	"	"

Spirituous Liquors.

Brandy,	contains	53.40	"	"
Rum,		53.68	"	"
Gin,		57.60	"	"
Scotch Whiskey,		54.32	"	"
Irish Whiskey,		53.90	"	"
American Whiskey, procured at Parker House, Boston (best),		50.00	"	"
American Whiskey, procured at Weeks & Potter's (real Bourbon, from Kentucky),		51.00	"	"
American Whiskey, worst of Michael Doherty's, with large deposits of extraneous matter,		44.50	"	"

*Lager Beer.**

Pfaff's, in Boston,	contains	5½	"	"
Second specimen,		6	"	"

The above American liquors and the lager beer were analyzed by Professor Wood, of the Harvard Medical School.

If the community follow the extremists of either side, a common standing spot can never be found. It is evident, if we can trust human testimony as given by our correspondents, beers and mild native wines should appear in a very different light before us from that which ardent spirits should hold. Cannot *Total Abstinence* advocates, therefore, as a present *Temperance measure*, permit the use of lager beer and of light wines, while all of their apparent but not real opponents, the *Temperance* advocates, should go to the utmost verge of moral suasion to check and finally banish, if that be possible, *ardent spirits* from the community.* Can there not be a union on this reasonable basis ?

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* See Dr. Wigglesworth's Letter, Appendix 9, for further remarks on the above subject.

Will Total Abstinence ever prevail universally ?

As I consider the love of stimulants a human instinct, which is seen wherever man lives, I cannot believe in the possibility of its suppression. It may be modified and regulated by the moral sense and by law when the gratification of that instinct interferes with the good order of society, but it cannot be by any means *extinguished*, prohibited. It rests upon a great cosmic law which cannot be annihilated by any puny effort of ours. The sun regulates that law as he regulates those of the seasons. We may modify its power and save ourselves by proper efforts from its effects, but the tendency will remain forever. In the presence of that really fearful law, all " Maine Laws " seem to me utterly powerless. But we in New England have not only this great climatic law to contend against, but we have also the influences of race and of a race educated to drunkenness by bad laws and by war. Therefore our task for the promotion of a real temperance is trebly difficult.†

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* Mr. Druitt says, " Cheap wine would cut off the temptation to gin and with an equal bulk of water would be in many cases a happy substitute for tea. I know a great deal of the better class of needlewomen, milliners, and speak from experience " (Beckwith, above quoted, page 75). Again he says, " No one who has ever made the experiment will fail to give the preference to wine over spirits or can refuse to give a helping hand to any ' movement ' that will send them fairly to their proper places as medicines for the sick and aged, and not as beverages for the healthy." "*Civilized*" (and I would add also as proved by our correspondence *uncivilized*) " man must drink, will drink; but it should be wine " (Beckwith, page 76).

† If we do not succeed in carrying out the principle of prohibition in Massachusetts it will not be the first unsuccessful attempt at legislation on liquor drinking made by the English race, as the following from Mr. Tovey fully proves: In the reign of Edward VI., a statute was passed called "An act to avoid excess of liquor." It declares that " none but those who can spend one hundred markes for yearly rent, etc., or be the son of a Duke, Marquis, Earl, Viscount or Baron shall have or keep more than ten gallons in his house." Second,—No tavern was allowed except in cities and only two in these except the larger ones, London having forty, the others less. Third,—No one was allowed to retail wine to be spent or drunk within the respective houses on pain of forfeiting £10 for such offence (page 43). († Quoted above.)

My position will be opposed by many. It will be denied that this is a human instinct, and in proof it may be said that some men and more women never during their whole lives use stimulants. Before admitting this argument, I must ask how many there are in the world who do not *use some stimulant.* There may be many who do not use alcoholic stimulants, but I suspect that there are but few, almost none, who "totally abstain" from *all* stimulants unless perchance it be some anchorite in his mountain cell who, from fanaticism, chooses to eat pulse and to drink water. I deem a love of stimulants as much a human instinct as any other of the so-called human instincts. And the proposition of total abstinence from stimulants, because intoxication prevails widely in the community, seems to me as preposterous as it would be to advise universal celibacy, because of the existence of gross evils in connection with those instincts that lead to the divine institution of marriage.

From the study I have made of our correspondence I am induced to believe that the permission to sell mild ales, beer, and light wines would, under certain very general rules, be really a promotion of temperance in New England, as it apparently is elsewhere. Should not therefore all friends of temperance, instead of endeavoring to bring about total abstinence, urge the general government to admit all mild "unfortified" European wines free of duty. They should urge the cultivation of the grape in this country. And upon this part of our subject permit me to refer to many details relative to American grape culture already given in a previous part of this communication.

NOTE.—While presenting this view I fully coincide with Dr. Anstie's remarks in his very important contribution made on this subject. They are in a work entitled "Uses of Wine in Health and Disease" (by Francis E. Anstie, M. D., of London. New York edition, Redfield, 1870.) "We would state our firm conviction that for youth (say under 25) whose bodily frame is not fully consolidated, the proper rule is *either no alcohol or very little indeed*" (page 18). Again: "Both temperance and economy most strongly argue that the bulk of the community should limit themselves to the class of natural wines produced under such conditions as enable the cheaper varieties to be relied on as sound, wholesome and palatable" (page 36). And again: "It is among the class of natural wines averaging not more than ten per cent. of alcohol that we must seek the type of a universal alcoholic beverage for every-day life" (page 16).

How shall we treat the Drunkard?

I think that the drunkard has been treated at times with a great deal too much of false sentimentality. Every young man should be taught to feel that, in getting drunk, he violates one of the highest of social laws. He degrades himself lower than the brute, and should be treated, for the time being, as one lower than man. I would not, however, be vindictive, but would put forth a hand to support him when he rises. This I would do again and again if need be, until I was convinced that he was a real *dipsomaniac* — a man insane for drink. Then I would for a time deprive him of his liberty, and he should be placed in an inebriate asylum. In the present condition of our country, Massachusetts should have several inebriate asylums. Over these asylums should be put men wise and humane, but firm of purpose. Under that surveillance the victim should remain until he had gained sufficient moral power to enable him to govern his appetite. He must be cured of his disease as he would be of any malady in a public hospital. Upon this subject I cannot speak with the authority of one who has had experience, I therefore shall quote from a communication* sent by Dr. Day, late superintendent of the New York State Asylum for Inebriates, now at Greenwood, in this State.

Summary of the principal Subjects considered in this Letter.

First.—Stimulants are used everywhere, and, at times, abused by savage and by civilized man. Consequently, intoxication occurs all over the globe.

Second.—This love of stimulants is one of the strongest of human instincts. It cannot be annihilated, but may be regulated by reason, by conscience, by education, or by law when it encroaches on the rights of others.

Third.—Climatic law governs it. The tendency to indulge to intoxication being not only greater as we go from the heat of the equator towards the north, but the character of that intoxication becomes more violent.

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* Appendix 1.

Fourth.—Owing to this cosmic law, intemperance is very rare near the equator. It is there a social crime, and a disgrace of the deepest dye. Licentiousness and gambling are small offences compared with it. To call a man a drunkard is the highest of insults. On the contrary, at the north of 50° it is very frequent, is less of a disgrace, is by no means a social crime.

Fifth.—Intemperance causes little or no crime toward the equator. It is the almost constant cause of crime either directly or indirectly at the north above 50°.

Sixth.—Intemperance is modified by race, as shown in the different tendencies to intoxication of different peoples.

Seventh.—Races are modified physically and morally by the kind of liquor they use, as proved by examination of the returns from Austria and Switzerland.

Eighth.—Beer, native light grape wines and ardent spirits, should not be classed together, for they produce very different effects on the individual and upon the race.

Ninth.—Light German beer and ale can be used even freely without any very apparent injury to the individual, or without causing intoxication. They contain very small percentages of alcohol (4 or 4.5 to 6.50 per cent.) Light grape wines, unfortified by an extra amount of alcohol, can be drunk less freely but without apparent injury to the race, and with exhilaration rather than drunkenness. Some writers think they do no harm but a real good if used moderately. They never produce the violent crazy drunkenness, so noticeable from the use of the ardent spirits of the North.

Ardent spirits, on the contrary, unless used very moderately, and with great temperance, and with the determination to omit them as soon as the occasion has passed for their use, are almost always injurious, if continued even moderately for any length of time, for they gradually encroach on the vital powers. If used immoderately, they cause a beastly narcotism which makes the victim regardless of all the amenities and even the decencies of life, or perhaps they render him furiously crazy, so that he may murder his best friend. While those who live in the tropics merely *sip* slowly ardent spirits from the tiniest of glasses, with the slightest appreciable effect, the denizen of the frozen North swallows half tumblers full of the same to the speedy production of intoxication.

Tenth.—Races may be educated to evil by bad laws, or by the introduction of bad habits. England's taste for strong drinks has been fostered by legislation, and by wars of nearly two centuries since. France and parts of Switzerland are beginning to suffer from the introduction of absinthe and of schnapps. Especially is this noticeable since the late Franco-Prussian war. By classifying all liquors as equally injurious, and by endeavoring to further that idea in the community, are we not doing a real injury to the country by preventing a freer use of a mild lager beer, or of native grape wine instead of the ardent spirits to which our people are now so addicted ?

Eleventh.—A race, when it emigrates, carries its habits with it, and, for a time at least, those habits may override all climatic law.

Twelfth.—England has thus overshadowed our *whole* country with its love of strong drinks, and with its habits of intoxication, as it has more recently covered Ceylon, parts of the East, and Australia.

Thirteenth.—This influence on our own country is greater now than it would have been if our forefathers, the early settlers, had cultivated the vine, which would have been practicable, as seen by the recent examples of Ohio and California, and from the fact that the whole of the United States lies in the region of the earth's surface suited to the grape culture.

Fourteenth.—If these early settlers had done this, our nation would probably have been more temperate, and a vast industry like that of France, of Spain and of Italy and Germany, in light native wines, would long ago have sprung up.

Fifteenth.—The example set by California and Ohio, should be followed by the whole country, where the vine can be grown. As a temperance measure it behooves every good citizen to promote that most desirable object. We should also allow the light, unfortified wines of Europe to be introduced free of duty instead of the large one now imposed. Instead of refusing the German lager beer, we should seek to have it introduced into the present "grog shops," and thus substitute a comparatively innoxious article for those potent liquors, which now bring disaster and death into so many families.

Sixteenth.—"Holly Tree" branches for the sale of good food, tea and coffee, cheaply to the people, should by the benevolent coöperation of the community, be made to take the places of the numerous grog shops now open for the sale of ardent spirits.

Seventeenth.—The moral sense of the community should be so aroused to the enormity of the evils flowing from keeping an open bar for the sale of ardent spirits, while those for the sale of light wines and of lager beer should not be opposed, except for the sale to habitual drunkards, after due notice from friends. Sellers violating such law might be compelled to support for a time the family of their victim.

Eighteenth.—The horrid nature of drunkenness should be impressed by every means in our power upon the moral sense of the people. The habitual drunkard should be punished, or if he be a *dipsomaniac*, he should be placed in an inebriate asylum for medical and moral treatment, until he has gained sufficient self-respect to enable him to overcome his love of drink. These asylums should be established by the State.

Nineteenth.—The appendix contains various letters on intemperance in this and other countries, on reciprocity treaties for introduction of European wines, &c.

In the sincere belief, gentlemen, that this analysis of our correspondence will, eventually at least, tend to help onward the most excellent cause of temperance everywhere, and in the hope that none will be offended at the expression, at times, of my own individual opinions, which in the course of the discussion I have deemed it my right and duty to give, I remain,

Your colleague and friend,

HENRY I. BOWDITCH.

APPENDIX:

CONTAINING ADDITIONAL CORRESPONDENCE TO THAT PUBLISHED IN THE SECOND REPORT OF THE BOARD, AND EXTRACTS FROM SUNDRY WORKS BEARING UPON THE SUBJECT.

[1.]

Prof. H. I. Bowditch, M. D.:

My Dear Sir:—The subject, to which you alluded in the brief conversation we had a few days since, is one which has occupied my attention for a number of years, and the more I investigate it the more complicated it appears as a social question. It is a fact that drunkenness is a disease only too common,—one from which our race has suffered almost from the beginning of its existence. In all ages political economists and philanthropists have sought a remedy, both from motives of economy and philanthropy. But it is only for the past few years comparatively, that men of learning have attempted an investigation from any scientific or philosophical standpoint. Good men have labored and prayed, while they were constantly lifting the warning voice; communities have been aroused and the most stringent laws have been enacted against the sale of intoxicating drinks; drunkenness has ever been branded as a crime *per se*, and yet the foulest deeds have constantly been committed, and the criminal records of all nations show, that the cause of a large percentage of offences that need to be punished by the strong arm of the law, are traceable to the inordinate use of intoxicating drinks.

Every community throughout the civilized world is suffering from the curse of drunkenness; for crime, pauperism, physical and mental debility are the natural fruits of intoxication. Such being the case, sober, reflective minds feel that the remedy must be sought for deeper than ever.

The time for itinerant lecturing by those who have only a superficial view of the subject, has passed away, and the disgusting style of mimicry and buffonery which used to caricature on the plat-form the antics and vagaries of the poor diseased inebriate, has ceased to be popular. Reflective minds, especially in our State, are beginning to reason about the matter, and they soon find that the entire subject resolves itself into the following inquiries, to answer which in the most conclusive manner, men of science have been carrying on their investigations:—

What is the true pathological condition of the unfortunate class of men called inebriates?—and can any remedy be devised by which those men can be restored to lives of usefulness, and instead of being mere drones in the social hive, become actual helpers in the Commonwealth?

As to the first question, did I possess the ability to answer it satisfactorily to myself, the limits of this communication, which of necessity must be brief, would render it impossible. I can merely throw together a few thoughts rather as suggestions, or hints, and I shall not attempt a thorough discussion of the subject.

There are various forms of inebriety, as there are various forms of fevers and of other diseases. There is for instance what is called dipsomania, which generally manifests itself in periodical attacks. For several months the patient may be a total abstainer, and oftentimes the loudest and most enthusiastic in denouncing either the sellers or drinkers of intoxicants. He is evidently in earnest, and often whole communities may be roused through his instrumentality against what he well calls the *damning traffic.* Soon, however, a sudden change takes place, and he is found again wallowing in the mire of intemperance. If the question be asked of him how he thus disgraces himself, his answer will always be that he cannot tell, nor point to the primary steps which led him to take the first dram. It came about suddenly, and before he was aware of it he had fallen. Such men, when the spell is upon them, will sacrifice friends, property, and even life to gratify their passion for alcohol. I have known such individuals to walk twelve miles through deep snow to obtain alcoholic stimulants, and in more than one instance even the very snow through which they struggled has become their winding sheet. They will deprive themselves of everything, even selling their clothes to procure the poison they crave.

Now, sir, I contend that there must be in the case of those men a pathological condition which we have not yet fathomed. There must be deep in the human framework a form of disease which we should reach and remedy before we can expect a thorough cure in such cases. The disease is *molecular*, affecting the molecules and influencing the operations of the mind, thus rendering its manifestions abnormal in different ways, of course, according to the habit and temperament of the individual. Some, for instance, are cruelly inclined, breathing out murder even against the innocent, while others are simply silly,—so generous that they will share their all with the first one they meet, or so pious that often unsophisticated persons really imagine that they mean what they say, and are truly the subject of religious influences. If even it is true that there is but one step from the sublime to the ridiculous it is especially the case with the dipsomaniac, who may to-day electrify by his earnestness for temperance while to-morrow he shall disgust by his maudlin talk while suffering from an attack. How can such cases be reached except through medical treatment in connection with wholesome influences? Another and perhaps a more numerous class of cases is what may be called the *asthenic* form. In this form the alcohol which is imbibed by the patient seems to have an affinity for the muscular system while the above-named class is more particularly affected in the nervous tissue. The patients in this case are more docile and good-natured while able to do anything, but they soon become helplessly drunk. At first the speech is affected, then the power of locomotion is lost, then follows a state of coma, during which the individual is quite insensible. After a while, he may arouse himself and move away, but only with the intention of procuring another drink.

Of course the two classes I have described may be subdivided into a number of varieties of which I have not time to speak now. I will simply say, in answer to my first inquiry, viz., Can anything be done for these unfortunates?—yes, most emphatically yes; and in my own practice I can point to numerous cases which have been thoroughly cured. True the process must be slow, from the very nature of the case, but a radical cure can be effected in most instances,—as often in fact as in any other disease of a psychological character. We have as yet never been able to use the requisite means for the proper treatment of such cases. I am aware that it is contemplated in this State to put in operation the means needed for that purpose, for our arrangements are now far from being satisfactory.

There should be one or more asylums for the treatment of these persons, situated away from business centres, where nature has been prolific in her gifts, where the "mind diseased" may find repose, where the corrupted body may be purified and made a medium for a higher, holier mental development.

I think it is the duty of the State to control the drunkard as it does the insane. I very much doubt, in most cases, whether persons thus afflicted can be cured, even with the best appliances in less than one year. In looking over my record for the past fifteen years I find the men who have remained with me the longest have shown the best evidence of permanent cure. I have thus, Doctor, made a few brief statements, which I believe to be true, and if carried out in practice would result in great good to the unfortunate, and be in harmony with the civilization of the age.

I have the honor to be, Sir, very truly yours,

ALBERT DAY.

GREENWOOD, Nov. 1, 1871.

[2.]

QUINCY, Sept. 20, 1871.

DR. H. I. BOWDITCH:

MY DEAR SIR:—In your note of the second instant you inquire "if the fact of wine being made in California tends to drunkenness or otherwise."

Before the introduction of the native wines, when the stronger alcoholic stimulants were used, drunkenness was very common in California. The native wines are now found in nearly every household; they have supplanted to a great extent the use of the stronger alcoholic drinks. It is a fact which no one familiar with California for the last twenty years will deny, that drunkenness is much less common now than formerly. This change is undoubtedly due to the substitution of the mild wines of the country for the stronger alcoholic stimulants.

I think the annual report of the Hark-Away Association of San Francisco will furnish you the statistical information you desire.

Yours respectfully,

JAMES MORRISON.

[3.]

GILSEY HOUSE, NEW YORK, Sept. 20, 1871.

MY DEAR DOCTOR:—I am well assured from my own observation, that the introduction and general use of light wines have contributed to the lessening of intemperance in Ohio. On my return home, I will endeavor to procure such statistics as may be obtained, if any exist relative to arrests, etc. The subject is an interesting one, and for a long time engaged the attention of Mr.

Longworth in his lifetime, who believed he was aiding, most materially the cause of temperance, by his encouragement of the culture of the vine.

I am, very truly yours,

LARZ ANDERSON.

HENRY I. BOWDITCH, M. D., Boston.

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[4]

IPSWICH, Oct. 28, 1871.

MY DEAR DOCTOR:—I have taken from the records of the Essex House of Correction, the following tabular view of the commitments for ten years, showing the percentage of common drunkards for each year:—

YEARS.	Whole No. Committed.	Common Drunkards.	Per Cent.
1861, ...	402	107	24
1862, ...	395	94	24
1863, ...	415	121	29
1864, ...	207	48	23
1865, ...	174	27	15½
1866, ...	225	19	8½
1867, ...	177	18	10
1868, ...	261	39	14½
1869, ...	214	45	21
1870, ...	232	29	12½

Now it may be that this has little bearing on the subject of prohibition. But there are some coincidences that are interesting. Whether they bear the relation of cause and effect is worth considering.

We had the prohibitory law on the statute book up to 1868, when the legislature passed a license law. Previous to 1865 there had been no special effort to enforce the law. The legislature of that year (1865) passed the Act creating the State Police, who were especially to suppress grog shops, etc. Now, observe that in 1865 the per cent. of common drunkards drops from 23 to 15½. The next year when the force had come to understand better their work, the per cent. fell to 8½, and was only 1½ higher in 1867. The license law of 1868 finds our per cent. of common drunkards at the close of the year, 14½. Its effect naturally must run over to the next year, and the per cent. reaches 21.

The legislature of 1869 revived the prohibitory law exempting cider, and in 1870 further exempted porter, ale and lager beer.

The returns from our small institution go for little, unless similar results should prevail throughout the State. I have no figures at command, but I somewhat confidently expect that what is true of this institution will be found general, so far as the decrease of common drunkards is coincident with the establishment and work of the State police, and the increase with the working of the license law of 1868. I think Boston, probably Suffolk County entire, should be excepted. The liquor interest has had its own way comparatively there.

The deduction from this small horizon line is inevitably in favor of prohibition, even with the confessed imperfect enforcement of the law.

I should state that I have presented common drunkards only as being the best representative of this view of the subject. I have omitted entirely the commitments for simple drunkenness, which will average as many nearly as the common drunkards, and with little variation in the proportion.

Nor is this all that intemperance brings to us. An analysis of the circumstances and causes of all the catalogue of crimes which fill the prison, shows that intemperance is the cause of crime in a large majority of cases.

Every year 60 per cent. of all our commitments are directly traceable to drunkenness. Can the tide be stopped? Is the enforcement of the law alone to rid us of the monster? Were there only the pecuniary interest of the liquor traffic to meet, powerful as it is, the result would not be doubtful. But there are climatic influences, the universal desire for stimulants, the education of our civilization for some centuries, social customs and hereditary tendencies, all tending, in a greater or less degree, to perpetuate the evil.

I doubt not all this may seem to you, and in fact is, trite. You comprehend all the difficulties of the subject.

A visit to Chicago in 1868, and my observation there of the habits of the German population, first brought to my mind doubts that total abstinence will ever be an accomplished fact. I visited the beer gardens on Sunday, to see how the Germans spend the day. There was a band of music, a dance floor, rude seats and tables like our New England picnics in a beautiful grove, and *lager* in such quantities as I had never conceived. Everybody, old and young, drank and seemed to continue to drink during the afternoon. But lager was the only beverage,—no liquors, no drunkenness, and no fights, or disorderly conduct. The young men and maidens were merry and danced; the elders drank and talked with the gravity and dignity becoming to the respectable German citizen; the children sipped their mug of lager, and gambolled on the grass, and all went home apparently sober, to resume without doubt their usual avocations on the morrow. There were probably two thousand persons taking their weekly recreation. And this was only one of half a dozen similar places about the suburbs of the city. Now if this had been an American or Irish congregation, and the beverage the usual vile concoctions called whiskey, gin and brandy, would not the closing scenes of the afternoon have been very different? Broken heads, bloody noses, and the wayside strewn with the wrecks of humanity in beastly intoxication. I thought, if we could be rid of the grosser liquors — banish them — put them in the pale of dangerous drugs, to be only dispensed by the physician like other poisons, and substitute the lager of the Germans, and the light wines of France and California, should we not be doing our best to exterminate the curse of drunkenness?

I expect we shall yet come to this conclusion. The difficulty is that with the tastes of our people, lager and wines will be, indeed now are, a cover for the sale of the grosser liquors; and worse than all, these liquors are without exception adulterated or poisonous.

I have written, at your request, this somewhat crude statement of my present views, as briefly as possible.

Truly yours,

Y. G. HURD.

DR. H. I. BOWDITCH, Boston.

[5.]

MADRID, October 30th, 1871.

MY DEAR DOCTOR BOWDITCH:—About your inquiry relative to the introduction of Spanish ordinary wines into our country, the whole matter of the projected international convention to which you allude, passed by so completely so long since, that I am afraid the data I could give you now would not be worth much for your purpose. It never amounted to any formal negotiation as between the two governments. The Legation archives might show something on this subject if thoroughly ransacked, but if my memory is not at fault the two governments never committed themselves to anything like definite propositions on any side. I perfectly remember, however, the circumstances under which the informal discussion of this idea arose and its course was in a few words as follows :—

It was when Spain was taxing the bread of the people of Cuba by a custom duty of eight (I think) dollars per barrel on American flour imported into Cuba, besides a discriminating duty against our shipping, by which all merchandize imported in our ships paid an extra percentage, over what it would have paid if imported in Spanish ships, whilst the Castilian flour paid only two dollars on its introduction into Havana.

We were pressing constantly for a reduction of these exorbitant duties upon our flour (as well as other articles) in Cuba, and the irritating discrimination against our shipping.

I did a good deal of good work in this direction, and it was a long time up-hill work, slow and apparently almost fruitless. At last, however, there were signs that considerable impression had been produced. Various leading senators and deputies came to me and in informal conversation exchanged their views with me, manifesting their willingness to reduce the Cuban flour duties if a corresponding concession should be made to Spanish products in the United States, and it was distinctly said that the reduction of our wine duties on the cheap ordinary wines grown in Castile would be the most desirable, as it would tend to reconcile the landowners of Castile to the loss of the protective duties, favoring their flour in Cuba.

I had several conferences on this subject, and remember clearly the statements of the Marquis of Duero, President of the Senate, saying that the lands of Castile were better adapted to the cultivation of vineyards than of wheat, and that the opposition of the Castilians to the reduction of the Cuban flour duties could be overcome, by thus conceding a better market for their wines.

In my communications to Washington on this subject, I remember to have urged the same argument stated in your letter—that the introduction of cheap and sound wines into our country would be a salutary measure for the health of our people, and would tend to diminish the vice of drunkenness.

I trust it would be so to some extent and after some time. But I greatly fear that the vitiated taste of our people, accustomed to whiskey and rum, and other strong alcoholic drinks, would reject the pure juice of the grape as insipid or less agreeable to them. If they did not like cheap wine they would not drink it, and it might be found to result, in practice, that no people can be expected to confine itself to drinking cheap wines except it produces them. I suppose that, if we ever come to produce them, we shall drink them also, and the taste for them will grow into our national habits, whilst the taste for rum and whiskey will grow out and decline.

But I doubt whether the efforts of the trader can hope to be so crowned. Trade depends on profits for its development, and a quick and constant demand for an article of merchandise is essential to build up the trade. I doubt whether the trade could build up the demand.

As regard the negotiations alluded to, no treaty was ever made. But continuing my efforts in the direction indicated we soon after did obtain (by Royal decree) the reduction of the Cuban flour duties, and the abolition of the discriminating duties, on the ground that it was not good policy for them to continue to irritate the Cubans, and throw them into sympathy with the United States by holding up to them constantly a barrel of flour worth six dollars at Key West, and fifteen dollars at Havana. Also, soon after, our war tariffs on wines, &c., made all idea of reduction on Castilian wines hopeless.

Yours ever faithfully,

HORATIO J. PERRY.

[6.]

24 CHARLES ST., November 9th, 1871.

MY DEAR DOCTOR:—Bastin in his "*Guide en Russie*," writes, "At the *fêtes*, champagne flows abundantly, and it was not without reason stated that the consumption of this wine in Russia exceeds that in any other country." "The common cheap drink is the bitter Kwass." "The immoderate use of brandy makes great ravages in the poor class, and, according to a report published by the best physicians, alcoholic liquors are one of the chief causes which now-a-days people the hospitals of St. Petersburg, and which have made so many victims." Walking out of Hotel de Bellevue, No. 58 Nevsky Prospect (the principal street) about midday, early in September, (and not a *fête* day) I counted eleven intoxicated people during a walk of six minutes, *i. e.* turning to the left I walked to the first bridge, crossing the street (three minutes distance) and back. I quote Bastin once more:—

"The national beverage is Kwass in St. Petersburg, also beer and brandy, the favorite drink of a people frequently indulging to excess, *like most northern nations.*"

The trade in Crimean wines has increased within the last few years. The Russian drinks spirit also in his tea.

In Sweden at the restaurants cold meats and many varieties of spirit, Branntwein (flavored with anise, &c.) stand on the counter and are indulged in by the customer for a mere trifle before beginning a meal, at which he is expected to take wine, and which closes "*en regle*" with Swedish punch, a strong sirupy fluid, the use of which is spreading into other countries. The Branntwein is like the German Kümmel, and is so cheap that the means of intoxication are always at hand. Still the Swede, "the Frenchman of the North," is not so gross in his indulgence in liquor as the Russian. Wines, of course, in the northern countries, far from France or Spain, are somewhat expensive. The beer is much inferior to the German beer, and less drunk.

In Norway (according to Dr. Munroe) "the consul here says beer has existed for thirty years or more; also that drunkenness is now on the increase." It may have existed, but certainly beer was more seen by me, offered to me, and spoken of in my hearing during my visit in 1870, than during my visit in 1866. Where he gets his proof that drunkenness is increasing I do not know. I was less annoyed by inebriates on my second than on my first visit, and even if drunkenness is increasing it is probably due simply to the spirit drunk, for the beer is too thin and weak ever to produce such an effect. It is much weaker than German beer, whereas if it is to take the place of spirit it should be at least as strong as beer elsewhere. Increasing poverty and thinning of the population is more probably the real cause of increase in habits of intemperance. As a rule, the Norwegian is more temperate in his whole manner of life than the Russian. Corn brandy is used by the country people.

Very respectfully,

EDWARD WIGGLESWORTH, JR.

[7.]

109 MT. VERNON ST., NOV. 18, 1871.

DR. BOWDITCH:

DEAR SIR:—In the summer of 1864 I spent a week in Gottenburg on the Swedish coast, and while there met a number of the inhabitants, both Swedish and English merchants. One evening the conversation turned upon drunkenness, the prevalent vice of Northern Europe, and they were unanimous in regard to the reform in this respect in Gottenburg, due to the introduction of cheap porter by Mr. Carnegie, a Scotch merchant and philanthropist.

Murray also alludes to this in his guide book. The distillation of strong liquors has diminished from 40,000,000 gallons in 1850 to 10,620,000 in 1861. It is but fair to say, however, that the American Encyclopedia attributes this to the increase of dissenters from the established church, and of temperance societies.

In 1865 I spent two months in Norway, travelling, and saw a great deal of drunkenness there, although beer is both cheap and abundant. Mr. Lootz, the Swedish and Norwegian counsel, says that this has always been the case in Bergen, his native city, and that the drinking of Fimkel, the corn brandy of the country, is still on the increase. It should be mentioned that the brandy is of course much cheaper in proportion than the beer.

Very truly yours,

W. F. Munroe.

[8.]

Fifth Avenue Hotel, New York, Friday, Nov. 24, 1871.

My Dear Sir:—I regret that I have not found an earlier opportunity of collecting my thoughts with reference to our conversation of last Sunday evening, and now that I think the subject over, I fear my remarks will be of a somewhat fragmentary character, for it is now nearly three years since I travelled through our Australian and New Zealand colonies, and I am unable to refer to my diaries and papers, or any books on the subject. I would, first of all, draw your attention to some of the exceptional circumstances in connection with the bearing of native wines on drunkenness in Australia. The classes of people who at present form the chief population of New South Wales, have a large element of convictism in them, and the low tastes consequent thereon have not yet been eradicated; also a large mass of emigrants to that colony, as well as to the colonies of Victoria, South Australia, and Queensland, though not actually of the criminal class are but a few grades removed, for a man who fails in the struggle of life in England from drunkenness, is generally shipped off to Australia by his friends; this rule holding good from the highest to the lowest classes. You have therefore a mass of mankind to deal with of the lowest type. The climate nearly all the year round is hot, and *thirsty* weather prevails for ten months out of the twelve; therefore drinks of some kind must be had, and the prevailing intoxicating liquors are Holland gin and brandy of the worst description. When these cannot be obtained, tea, without milk, sweetened with coarse brown sugar is the beverage, morning, noon, and night. A man may be so situated for nine months to two or three years that he can only obtain tea; he then comes to some of the towns, generally with money and drinks it all away, never stopping until his money is exhausted; and this it is which fills the lunatic asylums with those who have lost their reason through drunkenness. In the colony of Victoria are three large lunatic asylums built by the state at a cost of $725,000 dollars (£150,000), and I was informed by an officer high in the police service, that these asylums were largely filled by those who first suffered from delirium tremens, and then became insane. On this class, of what I should call hard drinkers, the larger cultivation of the vine would have no effect. They have always been accustomed to a strong, burning drink, and would consider native wine simply as so much water; but with the succeeding generation will grow up a taste for light wines, especially amongst the higher classes. The price of spirits and native wine is much the same, a drink of either being obtained from twelve to twenty-five cents. The demand for native wine is *largely* on the increase. Many wine growers told me in 1858 that their cellars of wine would be sold every year before the vintage had begun; the wine being drunk generally not more than one year old. I do not remember how long wine has been grown in Australia, but I think the first vineyards were established at Albany on the river Murray in New South Wales, and Victoria, about thirty years ago; it is, however, only within the last five or ten years that the demand has been sufficient to induce men to go into the vine cultivation, and I was informed that every year sees more land covered with vines, and greater pains taken with the production of the wine. In New South Wales and Victoria the wines are of the Bordeaux and Rhine description, and these are admirably suited to the climate. In South Australia a description of Spanish and Burgundy wine is produced, but these are chiefly sold for Tasmania, and the southern portion of New Zealand, where the climate is cold enough to admit of such heavy and generous wines being drunk. You will see by these remarks that the present is too early a period to judge of the effect of wine growing in Australia (no wine is made in New Zealand, and but little, if any, in Tasmania) on drunkenness in our colonies, the introduction of light wines being of too recent a date, and the present drinkers-to-excess being those who never have cared, and never would, for such a description of stimulating liquors. My idea is, that twenty-five years hence it will have had a marked effect in reducing drunkenness, and in improving the moral and physical health of our colonies.

Should you desire any other information, and will send me a list of questions I will try and answer them.

Believe me to remain, faithfully yours,

F. Jacomb Hood.

H. I. Bowditch, Esq., M. D., Boston.

[9.]

November 28th, 1871.

My Dear Doctor:—I looked up beer on getting home. Lager-bier is simply beer for storage,—from lager, a warehouse. It needs, therefore, to preserve it, a trifle more alcohol than beer which is to be drunk at once. The common Bavarian beer is a good type of lager-bier. This contains less than three per cent. of alcohol. In fact, lager-bier is so weak that most of the superior beers, even those for immediate drinking, are stronger than lager. Of these the best is Dreher's Klein Schwechater *Märzen* or March beer, in Vienna. So Bock-bier universally, (from Bock, a goat as butting everyone over who drinks it). And strongest of all, the Salvator bier of Munich brewed once a year.

"Gerhardt's Chimie Organique," Vol. II. p. 267, has a good article on beer. I quote from it.

Burton's ale,	8.88	per	cent.	of alcohol.
Brown stout,	6.80	"	"	"
London porter,	4.20	"	"	"
Small beer,	1.28	"	"	"
Augustiner double beer of Munich,	3.6	"	"	"
Salvator bier,	4.2	"	"	"
Bock bier,	4	"	"	"
Common Bavarian beer,	2.9	"	"	"

Thus while rum, gin, Scotch and Irish whiskeys, &c., contain fifty + per cent. of alcohol (fifty-three to fifty-four), ales never run up to nine per cent. and beers never run much above four and usually much less.

There is a good analysis of *German beers* in Liebig's and Kopps' annual report on chemistry for 1850 (Vol IV.), page 466.

In Pelouze and Fremy's Traité de Chimie, fifth vol., *i. e.* the second vol. of the Chimie Organique, page 467, there is a good article, "Beer = from 2–4 per cent. alcohol." Payen's Précis de Chimie Industrielle, Vol. II. p. 315, sets French beer at 4.5 per cent. Bloxam's Chemistry, page 1491, "strong ales." Johnston's Chemistry of Common Life, first vol., p. 301, agrees with your views. Barret, D'Alcolization, per cent. of alcohol in wines, p. 247. Henderson's History of Wines, Rhine wine, p. 221. Mulder's Chemistry of Wines.

With highest respect,

EDWARD WIGGLESWORTH, JR.

[10.]

MILTON HILL, Dec. 14, 1871.

MY DEAR SIR:—Our legislators have not as a body, it seems to me, given so much patient thought to the subject of temperance as it demands. In dealing with a matter may I not say of such infinite importance, because its relations seem to be almost infinite as affecting the welfare of the human race, everybody, and legislators in particular, should take into consideration climate, the effect of the sun, quality of the soil, and last but not least, race. Latitude has a good deal to do with temperance, and so has race. So far as my own experience — and I may safely say I have been no small traveller—goes, I am decidedly of the opinion that where light ales are used intemperance is a minimum quantity compared with those countries where are used rum, whiskey, brandy, Madeira and sherry, and in fact where any kinds of liquor in which the percentage of alcohol is large, are drunk.

I wish to call your attention for a moment to the islands of Porto Rico and Cuba, both of them islands of importance, and where the number of inhabitants is very large. Drunkenness in these islands is rare, but the use of wine is universal. The Spanish government, wisely I think, permit the free importation of the wines of Spain into those islands; and they are so cheap, costing the consumer for the common kind about five cents a bottle, and considered so wholesome that they are used by the poorest classes. Even the caleseros, exposed both night and day to sun and rain and late hours, use them freely at their meals, and I believe with good effects. I never saw a calesero drunk, or any the worse for his drinking.

Very truly yours,

E. H. FAUCON.

DR. HENRY I. BOWDITCH, 113 Boylston Street.

[11.]

In the Narrative of the United States Exploring Expedition by Commodore Charles Wilkes, U. S. N.*, we find the following ceremonial at the time of the making of the "*ava*" intoxicating drink and preparing it for the king of the Feejee Islands:

"Ava was chewing when Captain Hudson and his party entered. They were kindly received by the king who seated them near him. There is a peculiar ceremony used by these people in mixing their *ava*. It having been first chewed by several young persons, on the pouring in of the water they all raise a kind of howl. * * Those present were arranged in a semicircle, the chief operator being in the centre with an immense wooden bowl before him. The latter, immediately after the water is poured in, begins to strain the liquid through the woody fibres, and at the same time he sings. He is accompanied in his song by all present who likewise imitate all his motions with the upper part of their bodies while in a sitting posture. The motions keep time to the song. The king joined occasionally in the song, and when any important stage of the operations was arrived at the song ceased and a clapping of hands ensued. As each cup was filled to be served out, the ambati sitting near uttered the same wild howl as before. The first cup is filled from another, etc. * * * They are very particular to see that no one touches the king's cup except the cupbearer." Thus much we learn of the ceremonial of drinking the favorite stimulus of these islands.

In Vol. 5, page 98, Com. Wilkes in giving an account of the Kingsmill islanders, while he distinctly states that "they have no intoxicating drink," also describes a "toddy," karaca, procured from the cocoanut-tree. The twig on which the nut is growing is tied up and the fruit is prevented from ripening. The twig being then cut off, the juice, a species of liquid like molasses, flows out. This drink is used at feasts and dipped out of large bowls by means of cocoanuts or human skulls.

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* Narrative, etc., by Charles Wilkes. New York: Putnam. Vol. 3, 115.

[12.]

DRINKING HABITS OF KAMTSCHATKA.

Dr. Lindley* (page 38) states that the following disgusting custom prevails simply for the intoxicating effects, produced by a variety of fungus, called Amanita Muscaria: "It is used by the inhabitants of North-eastern Asia, in the same manner as wine, brandy, arrack, opium, etc., are used by other nations." The plant at times grows plentifully; at others is scarcely found. It is dried and preserved. It is swallowed as a bolus or taken in infusions in soups etc. Mixed with certain berries *(vaccinum uliginosum)* its effects are like those of strong wine. It makes a man a merry fool or dead drunk. It excites muscular exertion, and it produces violent spasms or narcotism according to the dose. But the most peculiar effect and which shows to what extent men will go for the sake of a stimulus, is the following which I shall describe in the words of the author:—"It is said that from time immemorial the inhabitants have known that the fungus imparts an intoxicating quality to that secretion (the urine) which continues for a considerable time after taking it. For instance, a man moderately intoxicated to-day will by the next morning have slept himself sober, but, as is the custom, by taking a teacup of his urine he will be more powerfuly intoxicated than he was the preceding day. It is therefore not uncommon for confirmed drunkards to preserve their urine as a precious liquor against a scarcity of the fungus. The intoxicating quality of the urine is capable of being propagated, for every one who partakes it has his urine similarly affected. Thus, with a very few Amanitæ a party of drunkards may keep up their debauch for a week. Dr. Langsdorf mentions that by means of a second person taking the urine of the first, the third of the second, and so on, intoxication may be propagated through five individuals."

[13.]

Dr. Tyler, late Superintendent of the McLean Asylum for the Insane, states to me that from long experience, he is sure that the tendency of the climate of California is to produce an exhilaration and excitement rather than depression of the nervous system and that this is exactly the reverse of the English climate, which tends to a depression of the same.

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* The Vegetable: or the Structure, Classification and Uses of Plants, etc; by John Lindley, Ph. D., F. R. S., and L. S. 3d. ed., London: Bradbury & Evans, 1846.

This difference of climatic effects is so noticeable that Dr. Tyler has frequently seen persons coming from California with rather unbalanced minds, and they were always exhilarated, rarely if ever depressed, after arriving in New England. Such persons frequently get well here. On the contrary, a man depressed here will recover in California, whereas under the English climate the depression would be increased. Southern Europe has a more exhilarating effect.

Dr. Tyler has noticed these changes so often in his consultation experience that he feels very confident the effects are those of climate and not those produced by change of place and scene.

[14.]

A physician who has under his professional charge a large institution for the maintenance of aged persons, informs us that the demand among the inmates for stimulus in the form of tea is a matter of constant observation, and he moreover gives it as his opinion that from twenty to twenty-five per cent. of the whole number are *tea-sots*, drinking tea regularly from four to six times daily, and as much oftener as they can procure it. They show the effect of this over-stimulation by increased mental irritability, muscular tremors; also in a greater or less degree by sleeplessness.

The following fact has also come to our knowledge: A domestic in the family of a friend appeared at times intoxicated. As it was certain she could not get any of the so-called intoxicating liquors, great surprise was caused, until at length the problem was solved by the discovery that the individual drank large quantities of the strongest tea, of which she was constantly sipping.

[15.]

Since the presentation of this Report to the legislature, and consequently too late for publication this year the Board has received a very voluminous, interesting and valuable report on the subject of Intemperance in Sweden. The paper was prepared by Mr. Gyllenshiöld, the secretary of the National Temperance Society of Sweden, and chief of an important bureau in the Department of Justice, at the request of the American minister-resident, Hon. C. C. Andrews. It will be published next year.

THE ADULTERATIONS AND IMPURITIES OF FOOD.

By HENRY B. HILL,

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THE ADULTERATIONS AND IMPURITIES OF FOOD.

On the action of acid Fruits upon Tin Cans.

If an ordinary tin fruit-can be opened, and its inner surface examined, it will be found covered with the crystalline figures often produced by the action of dilute acids upon tin, and known as the *moirée métallique.* This apparent corrosion of the metallic surface suggests the possibility that an acid fruit if kept for a sufficient time in such a can, might take into solution an injurious quantity of metallic impurity. Cases of poisoning by salts of tin are rare, and yet they are known to act as irritant poisons. (Taylor, Medical Jurisprudence, *sub.* Tin.) Moreover, in the making and sealing of the cans, a greater or less amount of solder finds its way inside, and thus the fruit comes in contact with an alloy containing from 30 to 60 per cent. of lead.

The following investigation was undertaken to determine the nature of the metallic impurities introduced into acid fruits by the use of tin cans, and whether such impurities were sufficient to render the fruit unwholesome.

All the common fruits, the tomato, peach, plum, cherry, apple, pear, currant, etc., owe their acidity to the presence of malic acid or acid malates. (Rochleder, Phytochemie, *sub.* Lycopersicum esculentum, Amygdalus persica, etc.) Some of them contain, in addition, citric acid or acid citrates. The tomato and peach contain the malates or malic acid alone. If, therefore, tomatoes and peaches preserved in this way carry lead and tin into solution, the action of such fruits as contain citric acid in addition, if materially different, would naturally be greater. As, moreover, tomatoes and peaches are more generally sold than other fruit, they were chosen for examination. Several methods of analysis were tried, and the following finally adopted:—

The fruit was transferred from the can to a large beaker, water was added, and, after a thorough stirring, and maceration of the solid portion, the liquid was poured off through a small hair-sieve. The pulpy mass left on the sieve was again treated with water and strained, and the washing continued until the fruit had been treated with about eight times its weight of water. The turbid liquid thus obtained was next filtered with the aid of a Bunsen pump, in order to remove the suspended organic matter, and also to insure the removal of any small particles of solder which might be present. The clear filtrate was then evaporated upon a water bath, and in order to destroy the large amount of organic matter held in solution, pure nitric acid was added in considerable quantity to the thick sirup resulting from evaporation. The mixture was kept at a gentle heat in a covered beaker, until red fumes ceased to be evolved, when the whole was transferred to a small dish, the excess of acid driven off, and the heat gradually raised until the oxalic acid and the oxalates formed during the oxidation were decomposed. The white residue was then dissolved in dilute hydrochloric acid, the solution transferred to a platinum dish, and a piece of pure zinc added. When the evolution of hydrogen ceased, the inner surface of the dish was found covered with a delicate metallic film, which proved to consist of tin, lead and copper. For the detection of tin, the reaction of auric and mercuric chlorides upon stannous chloride was used; for lead the reaction with potassic iodide, and for copper, potassic ferrocyanide.

Five analyses of canned tomatoes were made, although the first three were made according to different methods, and one of canned peaches,—all with the same results. The nitric acid and zinc used, as also the distilled water, were especially tested for metallic impurities.

Attempts were also made to determine quantitatively the amounts of the various metals present, but the quantities were so minute that accurate separation and determination could hardly be effected. Of copper and lead in every case, I found but a trace; tin, however, was present in somewhat larger quantity.

The copper may come from the use of copper kettles used in cooking the fruit, or, its presence may be due to the fact that commercial tin often contains copper.

The Adulteration and Impurities of Vinegar.

Vinegar is sold at the shops chiefly as "cider vinegar" and "wine vinegar." The cider vinegar is almost universally made from cider, as its name implies. Wine vinegar, on the other hand, although occasionally made from wine, is much more commonly made, by the "quick vinegar process," from diluted alcohol. The common adulterations are water and sulphuric acid. Good vinegar should contain from three and a half to four per cent. of acetic acid, and when the amount falls much below this, water has probably been added.

In the examination of the various samples of vinegar purchased in Boston, or its vicinity, the specific gravity and percentage of acetic acid were determined, as well as the presence and amount of sulphuric acid, and accidental metallic impurities.

The percentage of acid present was determined with a standard alkaline solution, and as the color of vinegar interferes with the use of litmus solution, the point of neutrality was determined with delicate turmeric paper. The alkaline solution used was at first sodic hydrate; but a baryta solution was afterwards substituted for it, as its reaction upon turmeric is more delicate.

As vinegars occasionally contain sulphates, baric chloride may cause a precipitate in the absence of free sulphuric acid. The amount of sulphuric acid present as sulphate, is generally small. As determined by Hassal (Adulterations Detected, p. 402), the amounts in three different samples of pure wine vinegar were found to be 0.024, 0.025 and 0.019 per cent. Nevertheless, as sulphates may accidentally be present in larger quantities, especially in manufactured vinegars, the presence of free sulphuric acid must be established.

Very many methods have been proposed for determining the presence of free sulphuric acid; but when the percentage of free acid amounts to but a few tenths of one per cent. I found no method by which I was able to reach satisfactory results. It occurred to me, therefore, to take advantage of the fact that hydrochloric acid is set free upon the addition of baric chloride to sulphuric acid. About fifty cubic centimeters of the vinegar were taken and baric chloride added in excess. It was then distilled from a small flask with a good cooler, until the greater part had passed over. The distillate was then tested with argentic nitrate, after the addition of a few drops of nitric acid. Pure vinegar, treated in this way, gave no reaction in the distillate for hydrochloric acid, but when 0.05 per cent. of sulphuric acid was previously added, the reaction was distinct and well marked. The addition of a considerable quantity of hydro-potassic tartrate gave a scarcely perceptible reaction.

The presence of acid sulphates would of course interfere with this test, but they can hardly be present in an unadulterated vinegar.

The results of the examination are given in the following table.

The specific gravities given are for 60° F. The second column gives the strength of the vinegar expressed in percentages of acetic acid. When sulphuric acid is present, the actual amount of acetic acid is of course less. The third column gives the percentage of sulphuric acid, and the fourth the reaction as above for free sulphuric acid.

	Specific Gravity.	Strength.	Sulphuric Acid.	Reaction of Argentic Nitrate on Distillate.
1, Cider Vinegar, ...	1 025	5.14	–	– –
2, " "	1.007	4.43	–	– –
3, " "	1.027	3.86	–	– –
4, " "	1.016	3.75	–	– –
5, " "	1.009	3 44	–	– –
6, " "	1.015	3.20	–	– –
7, " "	1.010	3.10	–	– –
8, " "	1.016	2 99	0.12	Decided.
9, " "	1.008	2.94	–	– –
10, " "	1.005	2 88	–	– –
11, " "	1.016	2.78	*	– –
12, " "	1.006	2 75	–	– –
1, Wine Vinegar, bottled, .	1.015	7.09	0.14	Decided.
2, " " " .	1 018	6.84	0.40	Decided.
3, " " " .	1.017	6 50	0.27	Decided.
4, " " " .	1.018	6.31	0.14	Marked.
5, " " bulk, .	1.008	5.14	0.09	Slight.
6, " ' " .	1.009	4.89	–	None.
7, " " " .	1.009	4.79	0.06	Moderate.
8, " " " .	1.006	4.30	0 12	Marked.
9, " " " .	1.007	3.95	0.20	Marked.
10, " " " .	1.008	4.30	–	None.

* Present but not determined.

The percentage of sulphuric acid was determined in four additional samples of wine vinegar as follows: I. 0.28, II. 0.20, III. 0.12, IV. 0.13. The first two gave a decided reaction for free sulphuric acid, and the last two a slight reaction.

It will be seen from the table that the adulteration of vinegar with sulphuric acid is common, especially in the wine vinegars.

Two samples of vinegar were found to contain lead, and in both instances it came from the leaden faucet for drawing it from the cask.

The first sample contained 0.09 per cent. of metallic lead, and the second 0.52 per cent. This latter percentage corresponds to 144 grains of plumbic acetate to the quart, or 4.5 grains to the fluid ounce. Too much cannot be said in condemnation of the criminal carelessness through which such poison was sold.

The determinations of sulphuric acid and lead were made by my friend, Mr. Charles E. Munroe, assistant in the laboratory at Cambridge.

The Adulteration of Coffee.

The microscope gives the readiest, if not the only practicable means for the determination of the adulterations of coffee. The different physical properties of ground coffee and of the ordinary adulterations, however, give the means for determining with tolerable certainty the presence or absence of adulterating substances without the aid of the microscope.

Genuine ground coffee, whether it be course or fine, contains very little dust, and even the finest portions feel sharp and angular. Adulterated coffee on the other hand, usually contains a large proportion of dust which is soft and smooth to the touch.

If a teaspoonful of genuine ground coffee be thrown into a tumblerful of cold water, it will float upon the surface of the water, while the substances usually used in adulterating coffees will sink under the same circumstances. If, when the suspected coffee is thrown upon cold water, part sinks at once, the sample is quite sure to be adulterated.

The results of a microscopical examination of coffees purchased in Boston and its vicinity, are given below. In every case the dust, and the portions which sank and floated when the coffee was thrown into cold water, were separately examined, and sections were made of such fragments as seemed from their fracture, color, or hardness, to be foreign.

Seventeen samples were examined. Of these ten were of coffees sold in bulk, and seven were of cheaper coffees sold in packages of one pound each.

Of the ten samples of the first class, not one was found adulterated.

Of the seven samples of the second sort, one contained no coffee at all; two contained very little coffee; four contained from 50 to 70 per cent. of coffee; seven contained roasted peas or beans; six contained roasted grain, chiefly wheat, and two contained also chicory. These mixtures were labelled "Java and Mocha," "Java and Rio," "French breakfast coffee," "English breakfast coffee," "Java coffee," and so on, although in no case were they sold to me as anything but mixtures containing coffee.

PROPER PROVISION FOR THE INSANE.

By Edward Jarvis, M. D.

PROPER PROVISION FOR THE INSANE.

All human Powers given for Development and Use.

All our manifold organs and faculties are given to us for use. The development, power and action of each are needful, not only for its own health, but for that of others. The constitutional force includes and depends upon the fulness of the health and strength of each organ, function, faculty or element of our nature.

The World the field for Human Culture.

The open, broad, living world, is the appropriate field for men's growth and labor. Its opportunities and duties, its responsibilities and influences, are given to us for these purposes. With its intercourse and coöperation, its sympathies and encouragements, with its attritions and mutual corrections, talent, mental and moral power are developed and strengthened and shaped for their destined ends. In this open field, and by these aids and correctives, every element of humanity may be stimulated to healthy growth and restrained from overgrowth. Here men, on the one hand, are encouraged and almost compelled to put forth all their force; and, on the other, to repress their tendency to waywardness or oddity, and correct their errors of thought and emotion, and thus they may complete and harmonize their elements of character, and make of themselves a perfect wholeness of manhood.

Evil effect of separate or solitary Life.

This is shown, not only in the successful results of each endeavor and life in the world, but also in the issue of experiments of training and living in narrower and exclusive social fields. The attempts, by design or by accident, in connection with limited purposes, to live separately from the world, or from any of its healthful influences, end in incompleteness of character. The residents in monasteries and convents, the members of societies set apart from the great and comprehensive social fabric, recluses, hermits, persons or families, that live alone and remote from others, without intercourse with men and women at large, even households, or large collections of either sex exclusively,—all of these have a less complete development and balance of character. They are less perfect men and women, and have eccentricities and peculiarities more frequently than those who associate with the general mass of the people, and take part and lot in their interests, trials and successes.

Effect of mutual Intercourse and Assistance.

Association with the world at large, in its manifold forms, tends to wear off the excrescences, and suppress the peculiarities and eccentricities of people, to give them a rounded and harmonious character, and to develop and establish those habits of thought, notions of life and appropriateness of judgment, that the world ever demands and loves to encourage in its members. This is what is usually called common sense, and what we call mental health—sanity.

As the elements of life are unceasingly renewed, and we repeat ourselves from day to day, we stand continually in need of the same corrective influences, the same mould of broad society which first shaped our minds, to prevent any undue weakness or growth, any deficiency or excess of any part, the production of excrescences, and to preserve the due proportions of a well-balanced character.

Dangers of the World may be escaped.

Although the world has power to do this good, and ordinarily does so much for its several members, yet it has also power to do evil. It offers temptations to excesses, stimulations to morbid developments and growths, to peculiarities, and sometimes fails to keep the better elements alive and strong. Thus its influence may at times disturb and distract, and produce moral and mental disorder; but these are exceptions to its usual healthy action, and the occasions of their morbid influence are to be guarded against and avoided, while the general, the greater and necessary good is to be sought, and turned to the profit of mental health and power.

The greatest and wisest teacher, while praying that his friends might have the fullest strength and perfection of character, asked, not that they should be taken from the world, but merely that they might be saved from its evil. Recognizing that the world was the true field of human growth, strengthening and usefulness, he desired that they should there live, and there engage in the ordinary social duties and participate in the usual social enjoyments, and thereby do the largest work for others, and gain for themselves the highest happiness and develop the most generous virtues, and yet be defended from injury. While he would warn and guard his friends from falling into dangerous places, he would give them unlimited opportunity of life and action in all others.

Action needful for Health of all the Powers.

Action is the natural condition not only of our whole being, but of all our individual elements. The organs and their functions, all the powers and faculties, physical, mental and moral, the appetites, passions and propensities, each and all in their several ways and under appropriate discipline, require action, in order that each may develop and retain its own strength, and contribute its due proportion to the fulness and perfection of the total life, to the establishment of the constitution and the formation of the character.

Action to be suspended in Disease.

But whenever any organ or power is diseased or disturbed, the first requisite is suspension of action as far as possible, to relieve it of its burden of labor, and give it opportunity to rest and regain its health. If this rest cannot be obtained without restraint, we apply force, as in the case of a broken limb, to prevent injurious action.

Suspension of action limited to necessity.

Yet this restraint is, as far as possible, limited to the organ or power that is disordered, while the others, that are strong and healthy, are permitted to perform their natural functions.

This restraint is limited not only to the part or power that is diseased or weakened, but to the lowest degree that is needful to prevent increase of disturbance and to secure recovery.

Usually, rest of the part injured or organ diseased is necessary for the reparation or cure. Some require only rest for these purposes, and to some even this is not needful. The judicious surgeon therefore, when called to treat a case of injury of foot, ankle, leg, or other part, first cautiously inquires whether action needs to be suspended, and if so, in what manner and to what degree. He asks first, whether mere quiescence is sufficient, if not, then whether it be needful to apply more restraint by means of a bandage, or must he add to this the starch bandage or wooden splint, or use the box to enforce complete rest. Still further, he inquires whether any other part of the power needs to be kept at rest.

In all this process of examination and judgment, he keeps in mind, both the necessities of the suffering limb and healthy requirements of the whole, and governs his suspension of action and the restraint by these considerations.

If the patient can move about, use his other limbs or organs, attend to business, or enjoy life, without detriment to the injured part, or impeding the healing process, he is encouraged to do so, and thus the recuperation is accomplished with as little cost of discomfort or loss of time as possible.

Dyspepsia and other Diseases.

On the same principle we treat other injuries and diseases of the body. In case of dyspepsia, the first question that presents itself is, what change in the habits is needful for restoration of health, and how far it is proper to interfere, by the intervention of remedies. With some, it is only necessary to change the diet. Sometimes a single article of food acts as a disturbing cause. The stomach may be not only unable to digest the offending matter, but it may be so disturbed by its presence as to be unable to digest whatever is eaten with it. In this case, the suspension of the disturbing cause is generally sufficient to allow the stomach to recover its ordinary power in regard to other kinds of food. More frequently several articles and sometimes the whole diet must be changed, and an entirely new system adopted. If this be insufficient, other measures, medication, etc., must be used. But in all cases the mildest remedy and the least interference are first considered, and each proposed increase is weighed, and its efficacy compared with the difficulty to be overcome, until such measure is reached as seems to promise to produce the desired result, and relieve the patient.

Insanity not an Identity.

That class of diseases of the brain which we include in the term insanity, like the class of diseases which we include in the term dyspepsia, is not an identity. Neither of these affections is a single morbid state or condition, still less is that condition in all cases the same.

As among men, the original mental and moral elements vary very greatly in their individual force, and still more in their combinations, and as they are exposed to manifold and various disturbing causes, so their derangements and new complications must be equally various and present results of mental disorder of which it is rare that two are alike.

Thus the whole range of insanity includes numberless and diverse conditions and manifestations, from the furious maniac, the dangerous homicide, down to the gentle, harmless, timid melancholic, who is fearful of injury from every circumstance, and shrinks from all intercourse with society and friends. And there are all intermediate grades and combinations of grades between these extremes.

Varied Insanity to be treated variously.

As in the management of dyspepsia, so in the management of mental disorder. Every plan of treatment must recognize this diversity of the disease, and be founded upon, and shaped according to, the especial condition and wants of the patient under consideration.

Insane to be separated from Causes of the Disease.

The first matter to be considered is the cause or causes of the mental disturbance, and to relieve the patient from their influence, either by removing him from them or by neutralizing their power.

As food is the natural stimulus of the digestive organs, so are ideas, thoughts, emotions the natural stimulus of the brain. As when the stomach is disordered and the food is found to be the disturbing cause, the rational course is to change the diet, in such a manner and to such an extent, as the case seems to require,—so, when the brain is disordered, the influences that act upon it for evil are to be changed.

In a very large part of the cases of mental disorder the causes are in, or are associated with, the persons, scenes and interests of home or business with which the patient is or has been connected. Sometimes the home or business may be so modified that the disturbing cause, if it be there, shall be removed or neutralized.

Some may be restored at Home.

A lady, in a family of great discipline and discretion, was troubled with delusions, and fell into acute dementia. She imagined that the evil spirit controlled her and prevented her free action. She was three hours in dressing, and as long in eating any meal, and a heavy torpor rested on all her movements of body or mind. The appropriate changes were made in the family. The influences were regulated so as to meet the patient's necessities. In a few weeks she regained her natural activity, the delusions disappeared, and now, for more than ten years, she has had no return of the malady. This is a single example; but others might be quoted of insanity being cured without the removal of the patient from home.

This class is small. The homes of few can be so modified and regulated that the lunatic can be there retained with a chance of restoration; most, nearly all, must go away. The question then arises, where shall they go?

Shall they travel?

Shall they take abode in ordinary families elsewhere? If so, shall it be with friends? With strangers? Shall they be placed under the special charge of a physician competent to treat them? Or must they go to a hospital to find the proper treatment for their malady?

Some need Separation only.

Some cases of lunacy are due to a single cause, presence or influence, and only need separation from it to recover. Some are insane only in connection with a single person, scene, circumstance or interest. Some women have delusions in respect to their husbands, and some men in respect to their wives, while in respect to all other persons or topics they are sound. In the presence of their partners, and when they are the subject of their thought or conversation, they are insane and talk wildly; but in company with others, and upon other subjects, they seem to think and certainly talk and act rationally. Some are disturbed, in the same manner, by their families, or by other persons, some by their business, some by certain plans or pursuits or studies, but have their reason in apparently full measure, when these are out of sight and out of mind.

Except in regard to the special subject of their delusion, or when excited by its presence, they seem to have rational possession of their faculties, and talk, reason, understand and appreciate ideas and sentiments, and hold fitting relations to those about them. They can manage their affairs, work, associate with the world, or some parts of it, and enjoy most of the common personal and social blessings, and contribute a good share to the comfort and advantage of others.

Some of these need only separation from these disturbing causes to overcome their susceptibility to these evil influences. They only need to go away from home, business or other sources of irritation, to regain their mental health. Among several cases of this kind, I quote a lady naturally cheerful and well-balanced, and an excellent housekeeper. She became depressed, anxious about her domestic affairs, peevish, irritable and very troublesome to herself and the family. Finding that, when away from home, her husband, children and servants, she manifested her usual amiability and self-discipline, I advised that she go to the country and stay with a friend, of whom she was fond, until she should regain her mental strength and self-control. She did so, under only general supervision, for four months, during which she manifested none of her morbid feelings, and then she returned to her home. She had no mental disturbance through the remaining eight or ten years of her life, but discharged her duties of an amiable, affectionate and disciplined housekeeper as she did before her illness.

A man doing a large and successful business, with no derangement of his affairs, was overburdened by the heavy responsibilities of the great interests and the anxieties of financial matters. He began to be fearful, and to worry. He lost power of concentration, would not attend to the common concerns, which he had managed correctly. He became depressed, was overcome with his doubts, and refused to go to his place of business or attend to any of his affairs when presented to him.

As I learned from his partners there was no real cause of disturbance ; that the affairs were sufficiently prosperous ; that the weight and complications of the business had overborne him, I sent him to the country to remain with a brother, where he could hear nothing of finance or trade. In a few weeks he regained his mental balance, his wonted cheerfulness and confidence. He returned to his business, and has given his usual attention to the affairs for the last five years, and has had no depression in that time.

Another case was a widow, who was suddenly left with a sufficient fortune, consisting of buildings, houses, stores and shops. Although she had sons and daughters in mature life, of excellent character, who were always ready to take charge of her business, she undertook to manage all her own affairs herself. She attended to the tenants, collected the rents, oversaw the repairs, paid the taxes, and kept all the accounts, persistently refusing the assistance of her devoted and competent children.

In course of two or three years, her mind gave way ; she became suspicious of every one, especially of her children ; she refused to trust them with any responsibility or care, saying they would defraud her. She became irritable, fearful of poverty and exceedingly penurious. She made her family suffer from want of sufficient food.

I advised her to give up all care of her property, and put it in the hands of a suitable agent, and go to another town and live with a brother, in whom she had great confidence. She did as I advised. In her new residence, apart from the disturbing associations, she regained her natural cheerfulness and trusting spirit, and at the end of about a year, returned to her old house, in her former health. But she did not resume the charge of her property. This was some years ago. Since her recovery she has been and is now pleasant, hopeful and confiding, and entirely without mental disturbance.

These are examples of a considerable class of patients who need only separation from disturbing causes for their restoration.

Some need Separation and Supervision.

Some others require supervision to regulate their conduct and the influences that bear upon them, and with their aid, they may live, in ordinary well-disciplined, discreet and affectionate families and there recover.

A wealthy lady of high culture, in another State, became suspicious and depressed. She refused to go to church, at which she had previously been a constant attendant. She refused to visit her friends, or see them when they called upon her, to go to the stores, and even to drive or walk in the streets, and at last to eat at the table in her own family. She gave up her favorite pursuits,—music, painting, drawing and reading. She shut herself up in her chamber, because she thought and said that every one was laughing at her, talking about her, and making up wry faces at her.

She was then brought to my care. She was placed in an amiable and cultivated family, where she was treated with great tenderness and sympathy, and where I could see her daily. A favorite relative, a lady of similar taste and culture, came and lived with her.

Her suspiciousness soon began to yield. She associated with the family, sat with them at the table and in the parlor. She walked, rode, and visited the neighbors with them, and at length became an agreeable companion, as in health. Her natural tastes revived. She began to play on the piano and sing, and to take interest in books, magazines and papers. She went to concerts, operas, and theatres. She visited picture galleries, took lessons in drawing, and always went to church. Thus her mind and feelings regained their natural tone, and at the end of fourteen months she went back to her home, and since that time, about six years, has had no return of her depressions or suspiciousness.

Without appearing to interfere, I had control of all the influence that reached her, and directed all her movements; and she lived, as she supposed, a lady of her culture and taste would prefer.

In the course of more than thirty years of observation of mental diseases, many patients have been managed with similar limited interference. Some were in my own family; some in the neighboring families, and few at their own homes. Most of them recovered under various degrees of repression and of strictness of guardianship; yet all in the ordinary domestic circle and in common dwellings, mixing more or less in society, taking some part and interest in the world and its affairs, and encouraged to practise their ordinary habits, and indulge their natural tastes, and exercise their undisturbed faculties so far as their maladies allowed, but always under supervision that watched over and controlled, in a measure, the circumstances that surrounded them and the influences that bore upon them.

Self-Limited Mental Diseases.

Professional experience and confidence have admitted many diseases into the self-limited class, in which no medication nor interference accelerates the cure. They only need separation from the disturbing causes and to rest, in order to allow their malady opportunity to pass through its natural and necessary stages. They need also to be watched to prevent any coincident derangement from aggravating the main disorder.

This is pathologically true in regard to some mental diseases. If cases of this class are not violent, but mild and manageable; if these patients have no delusions, nor morbid susceptibilities in respect to the people and matters about them; if they are in pleasant and discreet families, who can and will treat them properly, and suffer no injudicious interference and no evil influence to reach them, they need not go away from home.

Two cases within my observation illustrate this principle. Both of these were members of wealthy, kind, discreet families. Both were subject to periodical returns of insanity. Each of these, in the early attack, was sent to my care and recovered in my family, one in seven months and the other in three months, and then returned to their homes. There they enjoyed good mental health for several years.

Afterward, each of these ladies had a recurrence of the malady, and again their friends applied to me to receive them into my house. But as I had then ceased to take patients, they were both retained at their homes, where everything was arranged to suit their wants. They both recovered in about the same time that had before been required in their previous attacks.

Various Provision needed for varied Forms of Insanity.

Although I have been consulted in regard to, and requested to take charge of, all sorts of cases, I have only taken such as could be managed in a private house, and controlled by personal influence. I sent the others, the excitable and unmanageable, to hospitals. But since I have ceased to take immediate charge of any patients, I have yet been and am now called upon to give direction to many as to their future course for treatment and recovery.

Difficulty of finding means of treating the milder Cases.

Among these applicants there is a wide variety of pathological conditions, and an equally varied susceptibility of influence, and necessity of a corresponding difference of treatment with every degree of freedom and restraint.

Looking at this diversity, I have endeavored to put these patients in the way of receiving that kind and degree of influence, direction, medication and restraint which their several cases seemed to require. Some were left at their homes, some travelled, some went to the houses of friends or strangers, some to live in physicians' families, and many to the several hospitals suited to their conditions.

With the last I have found no difficulty, for there are plenty of good institutions for such as need their care. But for those who could as well, and as favorably for their recovery, live elsewhere, there is frequently a doubt, and for most, an insuperable obstacle in the difficulty in finding proper families that are willing to take a wayward or uncertain inmate into their fold, and the inability of most patients to pay the reasonable and necessary cost.

An insane person, however mild and yielding, is, in one or more of his elements, out of harmony with the rest of the world. On these points he is morbidly sensitive, susceptible of disturbance, and sometimes irritable. He is therefore to be treated with invariable consideration and tenderness; his peculiarities and his weaker points are never to be forgotten, nor touched with carelessness or disrespect. Every one that is brought in contact with him, the family with whom he dwells, the visitors, the neighbors whom he meets, must all be on their guard, lest they unwittingly disturb him. The conversation everywhere, in parlor, at the table, in the street, and every matter presented to his attention, every influence must be cautiously weighed and regulated with the same view.

If the patient require more than this negative non-interference in a well-regulated, good-tempered family, he must find it in the care of a suitable physician who can give time and attention to his management.

It is a great sacrifice for any family, however disciplined, discreet and kind, to hold themselves and all their elements, constant and casual, under such watchfulness and restraint. If they admit an inmate whose condition requires this of them, they must do it for charity or gain, some great love for the patient, or the expectation of large pecuniary reward.

Few patients can find, among their friends, families that have this moral and mental discipline, and the power and the heart to make this sacrifice. Few have the means to pay the proper cost of this private care, whether in the family of a physician skilled in and accustomed to treat insanity, or in any other, where the needful moral and mental qualities only are to be found. Consequently, the only resort for a great majority even of mild patients is the hospital.

Hospitals.

Here comes the natural question, whether the hospital, as now constructed, is adapted to the various conditions and wants of all classes of patients.

Ancient Notions and Treatment of Insanity.

In ancient times, when superstition and fear held precedence of science and diagnosis, insanity, in the world's eye, represented wickedness, and lunatics were believed to be the devil's possession. In such cases the pathology was self-evident, the indications equally clear, and the method of treatment seemed manifest to all, both wise and simple,—for the patient, either as a sufferer, must be rescued from the control of his demoniac possessor by the intervention of supernatural agency, or as a sinner or criminal, he must be treated with such punishment as his case seemed to demand. But, as the first, the supernatural and miraculous means of healing was not at man's command, the last, the punitory method, became the rule, which was, through centuries, adopted by the world.

Sometimes, according to the rude notions of the period, the triple purposes of religion, medicine and justice were combined in the treatment of lunacy. In the middle ages, when the monasteries were, in a manner, hospitals, to which the sick resorted for care or relief, the Franciscans had especial charge of the insane. In one of their establishments, some of these severe disciplinarians applied to their lunatic patients the same rule of chastening that they did to themselves, and gave to each one ten lashes a day.

Through the long ages, until modern times, the world looked with trembling fear upon insanity. They considered it dangerous and untrustworthy, and defended themselves, in the best manner that they could, from the harm that it might inflict, not upon the patient himself, but upon others.

These sufferers were bound with straps, handcuffs, leg-locks, shackles and fetters; they were confined in cages, in strong-rooms and in prisons, for the good, not of themselves, but of sound, strong, but fearful people at large. This method of treatment was in very general operation in the last and the preceding generations, and it has not even now gone entirely out of use.

Modern Lunatic Hospitals.

The lunatic hospital, as it now presents itself, as a curative institution, is modern. It is within the memory of the older people now living when the first was opened, and now there are fifty-eight of these houses of healing and charity in the United States, and several more are in process of construction.

It was a great advance in humanity and science to provide these houses for the insane, where most of them,—a very large majority,—if sent early, may be restored to health. It was a great and beneficent struggle to persuade the people to send their deranged friends to their care.

Hospitals need farther Improvements.

Now, having taken this great and satisfactory step in the management of insanity, for which all honor be rendered to the fathers who dared to lead the way, it seems that the time demands that another step be taken in the same direction.

Hospital Architecture.

We cannot fail to see that, in devising the plan of the modern lunatic hospital, the psychological architects have not forgotten that they are providing for a dangerous element of humanity,—that some of these patients are destructive, and others are disposed to break their bonds and escape,—and that many people suppose that most, and some fear that all of the insane belong to one or the other of these two classes. Assuming that caution is the first element of wisdom, they deem it safe, at least, to combine security with charity, and give an assurance that the patient shall do the world no harm, while they prepare the means of doing him the greatest possible good. So, while the hospitals are provided with all the internal arrangements,—rooms, wards, beds, furniture, etc.,—for the comfort and healing of the inmates within, they are also built with thick and impenetrable walls, windows grated with strong bars or inflexible rods, and heavy and strong doors, invariably locked.

Still holding to the idea that what one lunatic is, all may be, —if some are untrustworthy, and can be retained only by force or strength of barriers, others may have the same restless desire to escape,—the architect seems to consider it best to provide for the least and possible danger as well as the greatest and the manifest. Hence the building throughout, the side for males and the side for females, the wings for the violent and those for the gentle, the rooms for the dangerous man, even the criminal maniac, and those for the timid, trusting, child-like girl or elderly lady, all are built alike, externally strong.

Public Architecture.

Architectural ambition has sometimes been a stumbling-block in the way of improvement in the management of the insane. The external too often takes precedence of the internal in the plan. Some approved style of architecture—Grecian, Byzantine, Gothic, Elizabethan—is adopted, and must be followed with such proportions, harmony of parts, grace, ornamentation, as to present one unimpeachable whole, a magnificent front, that will impress itself favorably on the spectator, and appear well in photograph and engraving.

The public eye is more familiar with, and a better judge of the outward form than of the inward fitness. Cultivated taste is more fastidious and exacting than utilitarianism. The inconveniences of a bad arrangement of kitchen and stairway, of office and lodging room, are out of sight and may be forgiven; but the disproportion of outward wall, the want of harmony of parts, centre and wings, the misplacement of portico, column and pilaster, the violation of the accepted rule or model, are manifest and must not be tolerated.

A graceful and grand public building is the pride of the neighborhood. It is pointed out to, and remembered by, strangers, and so is known abroad. It gives an honorable reputation to the town and State. It gratifies the ambition of the projectors, the dignitaries and the people, while the inner conveniences, the facility of accomplishing the purposes of the structure, the comfort of the inmates may be overlooked or made to yield to the outward beauty and dignity.

The lunatic hospital has not always escaped this architectural danger. The shell, the encasement of the house being first determined, the manner of distributing the inner parts into wards, rooms, &c., follows. Household accommodations, dormitories, dining-rooms, passages, stairways, must be arranged according to the capacity of the inclosing wall, and then if this arrangement be such as to facilitate the business that is to be done within, if it be convenient for the workers, if the rooms, whose operations are offensive to each other, are wide apart, and those whose purposes are closely allied are in juxtaposition, it is sometimes due to good fortune rather than to original design.

The hospital is usually a single building, with many wings extending to the right and left, and backward, in equal proportion on both sides. One side is for the males and the other for the females, but both are alike in structure, in strength of wall, in iron-barred windows. There are several halls or wards, and some private rooms for each sex. These, too, are alike for both sexes.

Some of these wards are more airy and cheerful than others, for the various forms of disease, but the securities of grate and lock, the means of external repression are on one indiscriminate plan for all, however widely they may differ in their necessities or their dangers.

Although within the hospital there is a variety in the social arrangements, and the patients are classified according to the character of their disease, the violent, the mild, the demented are severally in their separate wards, yet they, the gentle and the furious, are placed all alike within these forbidding walls and in these secure rooms, beyond which they cannot pass.

Although in these strong buildings the patients are governed with the greatest wisdom, managed with the highest skill that the profession produces, and treated by all, both officers and attendants, with the best discretion, tenderness and respect, yet there is a want of opportunities of freer life, of the exercise of the faculties that are not diseased, of participating in such of the common enjoyments as many of the patients can partake of, without detriment to their health or impairing their chances of restoration.

Hospital Architecture needs Variety.

The question now arises whether hospitals cannot be so arranged as to meet the varied wants, capacities and liabilities of the inmates; whether they may not provide and offer the comfortable, home-like accommodations for the mild and the trustworthy, as well as the securities for the dangerous, and all the intermediate grades of strength and pleasant convenience for the intermediate grades of mental disorder.

Self-Respect of the Insane.

There are few elements of our nature that we cherish with more fondness and tenacity than our self-respect, and few things that we desire more than the confidence and respect of others. There are few things that grieve, mortify or disturb us more than distrust and suspicion. These are natural elements; they belong to all men in health; they are variously affected by insanity; they are extinguished or suspended in very few lunatics, but in most they remain active; in a large proportion they are little diminished, and in some they are exalted and intensified. In all, they should be treated with tenderness, and carefully preserved in healthy action, and should be used as one of the available means of restoration.

The insane, like other people, are apt to respond, in feeling and manner, to the kind of treatment which they receive. If trusted and if confided in, they will generally be more ready to endeavor to be trustworthy; but if suspected and if confidence be withheld, they lose that motive to deserve it. Yet all the patients, of every variety of character and tendency, are practically told, by the bars before the window and the lock on the door, that they are suspected of a determination to run away, and cannot be trusted. They are pained and depressed, perhaps irritable, and the government of the hospital loses this opportunity of gaining the sympathy and confidence of, and of establishing influence and power over the trustworthy, which a more generous and confiding manner of lodging might have secured.

A different arrangement would obviate this difficulty. Instead of one uniform plan of construction in every part, with the same means of confinement for all, in a single building, there should be separate buildings, differing in structure and character, according to the necessities of the various classes of patients. While some may be strong as the whole is now, for the untrustworthy and violent, others should be built in the form and manner of ordinary dwellings, with generous, confiding and unbarred windows and doors such as the patients have been accustomed to in health. Then the internal arrangements of rooms, furniture, &c., should correspond, and all present the outward appearance and inward character of a home. This is sufficient for the treatment of a considerable class of the insane, who, whatever may be their delusions on some subjects, are yet capable of appreciating and enjoying most, if not all the conditions of domestic life.

Architecture of Private Asylums.

Most of the private lunatic asylums of England, in which more than half of the paying patients of the kingdom are kept, are of this character. Many of them were built for and previously occupied as gentlemen's seats, which in all respects, internally and externally, in wall, window, room, furniture, resemble common dwellings of various classes and sizes.

Such are the structure and character of the houses, in which, for more than twenty-five years, I have treated patients of this class, in my own and my neighbor's families. Among all these, there have been no windows broken, and only one instance of an attempt to escape, through the window of a ground-floor room.

Wooden Sashes in Windows of some of English Asylums.

Some of the large new public asylums and the additions to some of the old asylums of England have the common wooden sashes of ordinary private dwellings in all their windows. But in the rooms, where the violent and excitable are placed, there are wooden shutters or strong wire network, on the inside of the windows.

Some parts of Hospitals should resemble Private Dwellings.

Moreover, as everything should be arranged to keep in the patient's mind feelings of home as much, and to remind him of the hospital as little as possible, these dwellings for the mild should be not only separate from, but out of sight of, the stronger and more forbidding house, which might call out their painful sympathies, or be an ever-present warning to them of their liability to change for the worse, and a standing threat, that if their disease should take an unfortunate turn, and they become excited, they must be removed to that place of stricter confinement.

Even the names by which the houses are designated have an influence on the tender sensibilities of the patients. They should not be called by any term that signifies a hospital or any of its parts, but by names that are used elsewhere for common dwellings, and have pleasant associations connected with them. They should be called *houses* or *places*, and if necessary to designate them more particularly, some term appropriate to their position or circumstance, as grove house, if near a grove, elm house, valley house, orchard house, &c.

Between these extremes, the larger house, with suitable means of security for the violent, and the simplest dwellings for the mildest and the trustworthy, there should be intermediate other buildings, with various grades of strength and grace, with the appropriate means of repression and guardianship, of comfort and freedom, which the intermediate classes of patients may need or can profitably enjoy.

In all of these the confinement and liberty can be measured in accordance with the condition of each patient. No chance is offered for the violent to injure, or for the untrustworthy to escape. No healthy power is restrained, and all have the opportunity to enjoy such of the comforts and graces of ordinary life as their maladies permit; and no part of the treatment interferes with the healing process.

Diversified Parts of the Hospital.

If the way is not clear for the erection of separate houses, for the different classes of the insane, in one establishment, and one building must be for all, the object may yet be attained, in great measure, at least, by having the several parts of this building varied in structure and character to suit the various conditions of the different classes of patients.

The architectural plan should not present one solid building, uniform in all its parts, but an apparent collection of houses, united together, yet diversified in appearance, character and purpose, like a row of houses of varied architecture and appearance in a city street. Some of these parts should be, as they now are, and others should be arranged, windowed and furnished like the different and separate houses already described, wherein the several classes of patients may have all the appropriate varieties of treatment, of security and indulgence, that their cases require.

Distrust of Hospitals.

There is in the community, both the sane and the insane, a frequent aversion to the hospital, and an unwillingness in some to submit their deranged relatives or be submitted to its restraints and close confinement. Most physicians hear of this at times. I hear it often from the families who apply to me to receive one of their number into my house, or to give direction as to the disposal of their disordered relatives. They seek for any means of cure or guardianship, private medical cure, residence in private families, travel, even empirical practice, rather than send to a public institution.

This varied character of the hospital would overthrow these objections in the minds of many, and draw to its fold some for whom other means of cure are sought, and others for whom none are sought for want of means to pay the necessary cost, and who are consequently retained at their homes as long as they can be endured, too often, until the day of healing is past, and then they are sent to the hospital for custody through their remaining years.

It would be a great boon to such patients as these to place the advantages of the hospital within their reach, and draw them to it in the early stages of their malady. It is true the hospital is legally open to them now, and they are, in terms, invited to come and enjoy it. But this is not in such a manner as commands their confidence, and so long as they have not the living faith that will carry them to these institutions, they lose this opportunity of being healed. Practically it is all the same to them, whether they are kept from the hospital by being locked out, or by the fear of being locked in, so it be that they do not enter. And the removal of the obstacle, whatever it may be, whether real or imaginary, will give them a real blessing, in this their only opportunity of returning to a life of sanity and usefulness.

It would be a boon to a large portion of the milder patients, now and hereafter to be in the hospitals, to be allowed to be under the faithful care and skilful treatment that now protects and heals them, and yet suffer no needless pain and mortification, and no unnecessary circumscription of their remaining enjoyments.

It is not proposed here to adopt the system of Gheel, with its many good elements and its great deficiencies and cruel abuses; nor the cottage system of Scotland, with its incompleteness; nor even that of Clermont, however excellent in much of its plan and operation; yet the power and the virtue that belong to them are not to be overlooked. We need a combination of these with the more stringent plan and management of hospitals here and elsewhere now adopted. We want a diversification of buildings or of parts of one building, according to the condition of the different classes of patients, providing as much restriction as the violent and untrustworthy need, and offering as much freedom as they and all others can safely and profitably enjoy.

THE USE AND ABUSE OF OPIUM.

By F. E. Oliver, M. D.

THE USE AND ABUSE OF OPIUM.

The well-attested fact of the increased and increasing consumption of opium in the United States, during the past few years, has suggested the inquiry whether, and to what extent, the so-called opium habit can be traced among our own inhabitants, and to what causes it may fairly be attributed. If it be true that this practice, so long an endemic in Eastern and Southern Asia, has appeared among us, and, according to a recent and careful observer, is rapidly gaining ground "in a ratio very considerably increasing as every successive year arrives," it is not too soon to look about us and see how far it has intruded upon our soil, that we may be the better prepared to meet, if need be, so insidious a foe. It is obvious, in an investigation of this nature, with the limited opportunity at command, that to reach more than an approximative result would be difficult, if not impossible. Many important sources of information are carefully guarded, and the habit is so unobtrusive as often to pass unnoticed by the casual observer, the professional eye alone detecting the secret in the haggard countenance, or in some maniacal propensity characteristic of the opium eater. It will not be surprising, therefore, if the statistics thus far obtained, although suggestive, seem meagre, and in many respects unsatisfactory.

The following are the questions addressed to the physicians throughout the State :—

1st. Are preparations of opium used by the people except for the relief of pain ?

2d. We would like to know whether the injurious use of opium has increased of late years, and, if so, the causes of such increase ?

Before referring to the replies to these questions, it may be well to glance for a moment at a few facts which bear indirectly upon this subject. Opium eating, or *opophagia*, as it has been sometimes incorrectly termed, viewed as a national habit, may be reckoned, says a recent writer,* to have "taken its departure" from about 1840. Previous to this time the supply of opium does not seem to have been beyond its legitimate demand. Since that date, however, the annual importations have increased from 24,000 pounds in that year to 154,841 pounds in 1870, this not including that subsequently exported. During the present year, the importations for the first six months have been at the still greater rate of about 246,000 pounds, exclusive of that exported,† or nearly ten times the quantity imported thirty years ago, the population having, in that time, somewhat more than doubled. Making all due allowance for the importation of smoking opium, which for the fiscal year ending June 30, 1871, was not far from 37,000 pounds, we still have, if we add that not included in the customs returns, an amount, at the lowest estimate, considerably above that already given. From the opinions of druggists of Boston and New York, and others informed on the subject, which are, however, more or less conjectural, it has been estimated that the amount of opium and its preparations regularly prescribed is not proportionally larger than formerly, and that thirty per cent. of that imported would cover all such prescriptions, as well as that used in the composition of the various nostrums. If we add to this, however, twenty per cent., we still have fifty per cent. unaccounted for, and which it may not be unreasonably supposed is used for other than its legitimate purpose.

In our endeavors to ascertain the extent to which opium eating prevails in Massachusetts, we regret that we are unable to present fuller returns. Less than one-half of those addressed have been heard from, these representing but a little more than one-third of the State.

Of the one hundred and twenty-five physicians from whom replies have been received, forty report, in answer to the first question, that they know of no case of opium eating. The remaining eighty-five state that opium is used to a greater or less extent in their respective circuits. In many of the smaller towns where the habit exists, the number of those addicted to it is reported as nearly as could be ascertained. In the returns from others, the terms "few," "many" and "several" are alone given, and in still others the number is altogether omitted. From such uncertain data, it would, of course, be impossible to arrive at anything like an accurate computation. The number in the towns where it is given varies from one to twelve, the latter being the largest reported in any one. In the larger towns,—as Boston, Charlestown, Worcester and New Bedford,—the number is necessarily much larger. On inquiry among the druggists of Boston, we learn that their experience is various, there being those who have little call for the drug, and who make it a rule never to sell it without a written prescription; while others have many regular customers. One druggist states that, although he never sells it without a physician's order, he has, on an average, five or six applications for it daily, in some one of its forms. Two other prominent druggists have each six habitual purchasers. Several report one or two. Much seems to depend on locality. In the more public streets, and in parts of the city where those addicted to the habit mostly reside, the sales are much larger.

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* Calkins on Opium and the Opium Appetite.

† U. S. Report on Commerce and Navigation.

In Worcester, one druggist reports that "opium is used to an alarming extent in that community."

In Charlestown, inquiry was made at all the eighteen druggists' shops. Of these, "eleven have at present no regular customers; one never sells, except on prescription; the remaining six report sales to regular purchasers of opium, as follows:—each shop has an average of two, the largest number to any one being four."

In Chicopee, the druggists report that they have a great many regular customers. Many others in various parts of the State speak of the habit as quite prevalent. A prominent druggist of Boston states that "the sales of opium preparations to the country trade is out of all proportion to those of other drugs."

From these statements the inference is unavoidable that the opium habit is more or less prevalent in many parts of the State; and, although it may be impossible to estimate it, the number addicted to the drug must be very considerable. The number of opium eaters in the United States, says a late anonymous writer,* has been computed, from the testimony of druggists in all parts of the country, as well as from other sources, to be not less than from eighty to one hundred thousand. How far Massachusetts contributes toward her numerical quota, must, for the present, be a matter of conjecture.

The daily amounts of opium reported as taken vary with the habit and idiosyncrasy of the taker. Few even approach De Quincey, whose daily laudanum potations amounted to more than half a pint, equivalent to about three hundred and twenty grains of the gum.

In the town of Athol, of twelve opium eaters reported, "one person takes an ounce of laudanum daily; another, nine ounces weekly; another, two ounces monthly; two take one drachm of sulphate of morphia each, weekly; two take half that quantity in the same time; and two take a drachm of this salt each, monthly; one takes one ounce of opium, and one twice this quantity every month."

In Charlestown, the largest monthly sale of the sulphate of morphia is ten drachms; the average to each of five is eight drachms monthly; of laudanum, two persons are reported who each buy thirty ounces per month; one buys eight ounces of crude opium in the same time; one uses about one ounce of opium monthly; and two others two ounces each.

In Leyden, one person is reported who takes one drachm of the sulphate of morphia weekly.

In Shrewsbury, "of seven habitual opium eaters, one drachm of the sulphate of morphia, weekly, is the largest amount used."

In Shirley, one drachm of the sulphate of morphia is taken, by the one opium eater reported, in three weeks.

In Swampscott, one person is reported who takes two ounces of laudanum daily.

In Boston, one druggist sells to a customer one ounce of laudanum daily,—two ounces being ordered on Saturday.

It will be noted that the largest quantity of crude opium taken was eight ounces per month, or about one hundred and twenty-eight grains daily. The largest reported daily amount of laudanum was one ounce. The largest monthly sale of the sulphate of morphia was ten drachms, at the rate of one-third of a drachm daily, and equivalent to not far from one hundred grains of the gum. A Boston druggist informs us that not long since, an habitual customer bought a drachm of the sulphate of morphia, one-half of which he took on the spot, and, on the following day, having disposed of the remainder, called for a draught containing an ounce and a half each of laudanum and brandy. No apparent effect followed the dose referred to.

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* The Opium Habit.

The question as to the increase "in the injurious use of opium," and the causes of such increase, where this exists, seems to have received but partial attention. Of the eighty-five correspondents above mentioned, thirty-nine make no allusion to this inquiry. Twelve are of the opinion that the habit is decidedly on the increase, twenty-eight, that it is not increasing, and six, that it is diminishing, in their respective districts. These opinions, not always based upon very accurate observation, must be taken for what they are worth. The more general opinion among the best informed druggists throughout the State is that the habit is increasing.*

The following extract from a communication received from one of the State Assayers, Mr. S. Dana Hayes, will be found of especial interest in this connection :—

"In reply to your inquiries, it is my opinion that the consumption of opium in Massachusetts and New England is increasing more rapidly in proportion than the population. There are so many channels through which the drug may be brought into the State, that I suppose it would be almost impossible to determine how much foreign opium is used here; but it may easily be shown that the home production increases every year. Opium has been recently made from white poppies, cultivated for the purpose, in Vermont, New Hampshire and Connecticut, the annual production being estimated by hundreds of pounds, and this has generally been absorbed in the communities where it is made. It has also been brought here from Florida and Louisiana, while comparatively large quantities are regularly sent east from California and Arizona, where its cultivation is becoming an important branch of industry, ten acres of poppies being said to yield, in Arizona, twelve hundred pounds of opium. This domestic opium is often improperly manufactured in the form of expressed juice from the whole poppy plant, including the stems, leaves and flowers, instead of the exuded sap obtained by scarifying the capsules of the plant. It is generally deficient in morphia, and is sold in balls of sticky paste, covered with green leaves, or as a semi-fluid, like thick-boiled molasses, in boxes. That which is not used where it is produced, including the shipments from California and the West, together with inferior and damaged parcels of foreign opium received and condemned at this port, is sent to Philadelphia, where it is converted into morphia and its salts, and is thus distributed through the country.

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* This increase in the use of opium seems the more remarkable when we remember the extent to which, as we are told, chloral, chloroform and ether are now taken in our community, especially among women, for purposes of stimulation and sedation.

"Opium and morphia are not only freely used in patent and *commercial* medicines, but they have now become common ingredients in many family remedies, which were formerly made at home from simple herbs and roots,—such as cough mixtures, tooth washes, lotions, liniments, enemas, poultices, healing tinctures and decoctions. Opium is consumed in the form of pills often made by very unskilful hands, and it has been found in alcoholic liquors, especially in the brandy which was sold publicly in one of the western towns of this State.

"Among the most dangerous preparations of morphia are those now prescribed and sold by uneducated or villainous individuals as so-called 'cures' for persons afflicted with the uncontrollable appetite for opium—'Relief for the Opium Eater'—; and the very existence of such nostrums certainly indicates the extent of the disease. One of these preparations consisted of a clear solution of sulphate of morphia, colored pinkish by aniline fuschine, and sweetened; the directions accompanying it were not very definite, but a dose containing about two grains of sulphate of morphia was to be taken three times a day, 'if necessary,' by the patient, when suffering badly from depression and other symptoms.

"I need only refer to the frequency of wilful and accidental poisoning and narcotization by morphia or opium, as you are familiar with such cases; but they are certainly increasing every year in this State."

Among the proximate causes of the opium habit, that which owes its origin to the opiate treatment of certain nervous and other chronic affections, especially of the bowels, is perhaps the more common. The prolonged use of the drug in such cases, too often without medical sanction, places the patient in the greatest jeopardy; for the appetite, once acquired, is with the greatest difficulty controlled. A late writer, who says of himself that he "had eaten much more than half a hundred weight of opium, equivalent to more than a hogshead of laudanum, and had used it uninterruptedly for fifteen years, was first induced to take it for a disordered condition of the digestive organs;" and it will be remembered that it was for an attack of neuralgia that De Quincey first sought the druggist's shop.

In the extracts from the letters of our correspondents given below, it will be noticed that frequent mention is made of this habit, as caused by the injudicious and often unnecessary prescription of opium by the physician. So grave a statement, and one so generally endorsed, should not be allowed to pass unnoticed by those who, as guardians of the public health, are in no small measure responsible for the moral, as well as physical, welfare of their patients.

It is unnecessary here to do more than allude to the other physical causes that occasionally lead to excess in the use of opium, dependent upon a depressed condition of the nervous system, induced either by occupation, overwork with deficient nutrition; or by a vicious mode of life, as prostitution, and, sometimes, intemperance. Those more generally exempt from this vice are out-of-door laborers, and others whose occupations allow an abundance of fresh air and nourishing food, with regular hours of sleep. A deficiency in these natural stimuli, so essential to sound health, promotes a desire for artificial substitutes, and opium, where others are unavailable, is often resorted to. In England, and we suspect the same would be found true, although to a less extent, in our own country, the opium habit is especially common among the manufacturing classes, who are too apt to live regardless of all hygienic laws. The taste for opium eating among soldiers retired from the army is alluded to by a few of our correspondents. It seems also to have been noticed in England, and is probably due to the habit acquired in the service, or to shattered health, the result of campaign exposure.

The fact generally remarked that women constitute so large a proportion of opium takers, is due, perhaps, more to moral than to physical causes. Doomed, often, to a life of disappointment, and, it may be, of physical and mental inaction, and in the smaller and more remote towns, not unfrequently, to utter seclusion, deprived of all wholesome social diversion, it is not strange that nervous depression, with all its concomitant evils, should sometimes follow,—opium being discreetly selected as the safest and most agreeable remedy.

We must not omit, however, one other most important cause of this habit referred to by our correspondents, and the most general one of all that predispose to it. We allude to the simple desire for stimulation,—in the words of another, "that innate propensity of mankind to supply some grateful means of promoting the flow of agreeable thoughts, of emboldening the spirit to perform deeds of daring, or of steeping in forgetfulness the sense of daily sorrows."* No climate and no soil is without some product of its own which furnishes, at man's bidding, a stimulating ingredient to meet this universal want. In an age, too, like our own, of unprecedented mental and physical activity, the constant over-exercise of all the faculties, together with the cares and perplexities incident to a condition of incessant unrest, create a keener appetite for some sort of stimulus. No clearer confirmation of the truth of this statement is needed than the present enormous consumption of alcohol and tobacco, as well as of those milder stimulants, tea and coffee, for which there is an ever-increasing demand.

The selection of opium in preference to other stimulants, due more often to a taste, natural or acquired, is sometimes prompted, as appears in our reports, by motives of expediency—the facility, perhaps, with which it can be procured and taken without endangering the reputation for sobriety. In one town mentioned, it was thought "more genteel" than alcohol.

The question how far the prohibition of alcoholic liquors has led to the substitution of opium, we do not propose to consider. It is a significant fact, however, that both in England and in this country, the total abstinence movement was almost immediately followed by an increased consumption of opium. In the five years after this movement began in England, the annual importations of this drug had more than doubled; and it was between 1840 and 1850, soon after teetotalism had become a fixed fact, that our own importations of opium swelled, says Dr. Calkins, in the ratio of 3.5 to 1, and when prices had become enhanced by fifty per cent.† "The habit of opium chewing," says Dr. Stillé, "has become very prevalent in the British Islands, especially since the use of alcoholic drinks has been to so great an extent abandoned, under the influence of the fashion introduced by total abstinence societies, founded upon mere social expediency, and not upon that religious authority which enjoins temperance in all things, whether eating or drinking, whether in alcohol or in opium." And, in other countries, we find that where the heat of the climate or religious enactments restrict the use of alcohol, the inhabitants are led to seek stimulation in the use of opium. Morewood, also, in his comprehensive History of Inebriating Liquors, states that the general use of opium and other exhilarating substances, among the Mahometans, may date its origin from the mandate of the Prophet forbidding wine. These statements accord with the observations of several of our correspondents, who attribute the increasing use of opium to the difficulty of obtaining alcoholic drinks. It is a curious and interesting fact, on the other hand, that in Turkey, while the use of wine of late years has increased, that of opium has as certainly declined.

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* Stillé's Therapeutics and Materia Medica.

† Opium and the Opium Appetite.

We had almost omitted to mention one source of the opium appetite, more than once referred to by our correspondents: we allude to the taste implanted in infancy and childhood by nursery medication. When it is remembered that nearly all the various soothing sirups contain this drug, or some one of its preparations, in greater or less proportion, it will not be surprising that such a result should sometimes follow.

The following extracts from the letters of our correspondents contain replies and the question as to the increase, and the causes of increase where they exist, of the opium habit in Massachusetts:—

Ayer.—"Those addicted to opium are all females; and most of them contracted the habit from the use of physicians' prescriptions during sickness."

Belchertown.—"A few cases among the lower classes, where it is resorted to as a stimulant."

Barre.—"Yes. Primarily by medical advice for relief of pain; and then suffered to relapse into confirmed opium eaters, I think through the fault of their medical advisers."

Chilmark.—"Five cases reported, originating in opiate prescriptions."

Clarksburg.—"I think it on the increase, because doctors prescribe it more indiscriminately now than formerly, thus establishing the habit with the patients."

Concord.—"There are a few instances in which opiates are injuriously used. In every case that has come under my observation, it has resulted from the use of intoxicating liquors, and as a substitute for them."

Dedham.—"Several nervous women take opium here."

Eastham.—"I think the use of opium has slightly increased, mostly among females."

Everett.—"I am of the opinion that the use of opium has increased of late years, it being considered more 'genteel' than alcohol."

Fairhaven.—"Opium is used without medical advice and not for the relief of pain. The use has increased of late years. Man naturally requires, or thinks he requires, stimulants of some sort. People live very differently from the way they should; food, labor, exposure to changes of weather, insufficiency of clothing, these affect the system physically and morally in so many ways, that longings are produced for something to make them feel more comfortable; opium will do it and is used."

Granby.—"Two cases reported, originating medically."

Hadley.—"Opium is used otherwise than by advice, and the habit is increasing. It seems to me that the general tendency to use some stimulant has an influence. The use of opium as a stimulant is becoming better known, and the restraint of an adverse public opinion is less felt."

Hinsdale.—"There are probably half a dozen opium eaters here, all females but one; the habit was originally contracted in these cases by means of the opiate treatment of neuralgia."

Leverett.—"One opium eater in town—a woman—who first took the drug for the relief of pain.

Newburyport.—"I think the use of opium and its preparations is confined to elderly people. The young and middle-aged are more addicted to tobacco."

North Andover.—"We have a few people who use opium as a stimulant."

Shrewsbury.—"Of seven habitual opium eaters within my observation, five began the use by medical prescription, and were unable to leave it off. All are persons past the middle age, and all have used the drug many years."

Swampscott.—"The use of opium in its various forms has materially increased within the last ten years. It is used, in many cases, in place of rum. I know of one person who takes two ounces of laudanum daily, as a substitute for alcoholic stimulants, and attends to his business regularly."

Stoneham.—"Preparations of opium are used by a certain portion of the population for purposes of stimulus and sedation, without medical advice. I think that the practice has increased of late years, and that the cause mainly consists in overwork; the ease with which opium can be procured, and the facility of administration without leaving work, contributing to its selection."

Truro.—"A number of persons in town who have continued the use of opium, which was given in the first instance to relieve pain."

Uxbridge.—"One case cited of habitual opium eating, originating in the opiate treatment of neuralgia."

Warwick.—The preparations of opium are not extensively used. I think that in most towns the abuse has increased, arising from the too free employment of opium in chronic diseases."

Westfield.—"I have reason to believe this practice exceedingly common among certain classes of people who crave the effects of a stimulant, but will not risk their reputation for temperance by taking alcoholic beverages."

Watertown.—"I know of very few opium eaters, and the number is not increasing. The sub-cutaneous use of morphia tends strongly to reëstablish the habit."

Upton.—"Preparations of opium are used in a few cases, commenced when suffering from severe and continuous pain, and followed until the habit became fixed."

Worcester.—Information has been collected by our correspondent from several practitioners, as follows:—

"I have talked with some of our most intelligent apothecaries, who tell me that the use of opium is greatly increased, especially among women. The reasons which one gave are these: The doctors are prescribing it more to their patients, and thus the habit is acquired. There is also the desire for some form of stimulant. Alcoholic stimulants being prohibited, many have resorted to the use of opium."

"Opium eating is undoubtedly very common in this community, but whether on the increase I have no means of knowing."

"Druggists tell me that they sell a great deal more opium and morphia to the people than they used to, and that it is used by women and others, who could not take alcoholic liquors without publicity. I recognize no more misuse of these drugs than formerly."

"Another gave it as his opinion that 'the use of opium in its various preparations is increasing among the people as a stimulant, and is now being used to an alarming extent. I believe this to be due largely to the unpopularity and restricted use of alcoholic liquors. I believe there is a natural craving for some artificial stimulant with almost every human being, which is greatly increased by the cares and perplexities of life, and therefore is more apparent as age advances. This desire should be satisfied by the milder and least injurious drinks, as beer, light wines, etc.' "

Another states, "I think opium and its preparations are used to a considerable extent as stimulants, and am inclined to the opinion that such use is increasing, and that such increase is due, in some degree, to the excitements, suffering and mental disquietude resulting from the late war."

Clinton.—"Our apothecaries inform me," says our correspondent, that "the use of opium is steadily increasing among the people. I know of no particular cause for such increase, except the injudicious advice of some physicians."

Prescott.—"The preparations of opium are used by the people to some extent, otherwise than medicinally. I do not know whether the habitual use of opium has increased of late years or not; but my opinion, based upon conversation with those who sell it, is that it has not, in this vicinity, being confined mostly, if not wholly, to elderly people; and that young people are not forming the habit."

Boston.—Among the twenty or thirty druggists consulted, there seems to be a diversity of opinion on this subject. Many never sell opium without a physician's order, others have little or no call for it, while others have several habitual customers. The following statements are among the most important:—

"Believes the habit of opium eating diminishing, as he has fewer calls than formerly. He has only a single customer, at present, who sometimes buys half a drachm of opium daily."

"Has no regular customers, as he makes it a rule not to sell irregularly, and has advanced his price on such transient sales. Recognizes the fact that the habit is a general one in the community; but believes the abuse will be found more common in the country, where the drug can be obtained freely, and where stimulants are less available."

"Has two regular customers, who each average one ounce of opium every two weeks."

"Has one customer who buys half an ounce of opium at a time. The number of calls is less than formerly. Has observed that veteran soldiers who contracted the habit in the army hospitals are still addicted to the use of opium."

"Sells a very small quantity of opium in the course of the year to the class of customers alluded to. States that the sales of the opium preparations to the country trade is out of all proportion to that of other drugs. Explains the fact by the universal appetite for stimulants or excitement. City people have amusements, social enjoyments and alcohol; country people have less of these. Thinks that returned soldiers are rather prone to the habit, having contracted it in the army. Would look for the opium abuse rather in the suburbs and in the country than in the city."

"Sells less than he did five years ago. Thinks chloral and bromide of potassium are taking the place of opiates."

"Has six habitual customers, some of them, merchants, who take the dose of opium or morphine before commencing daily business. The demand is steady without any apparent increase. Has noticed a marked tendency to kleptomania among customers of this class."

"There is less call than formerly, due possibly to recent change of location."

"Has noticed no increase in the call for the opium preparations. Thinks that physicians are not sufficiently careful in regulating and restricting the use of opium before it becomes a habit."

"In an experience of twenty-five years has observed no decided increase in the habit of opium eating. Recognizes the correlation in the abuse of opium and of alcohol. The opium habit frequently begins in the use of opium medicinally. Veteran soldiers, as a class, are addicted to it, and several cases have been observed among Italian hand-organists."

"Thinks the abuse is not uncommon in the community, but that it is less in Boston than elsewhere. Would look for it rather among professional men, than among the poorer classes."

"Has observed a slight increase in the call for opium, especially in the form of laudanum and paregoric. Cannot explain the cause of such increase."

"Of calls for opium and laudanum, thinks there are fewer than formerly. For paregoric, there is a greater demand for domestic use; and for morphia, there is an increased call, observed chiefly among the prostitutes of the West End, who take it for the sedative effect."

"From his own experience, believes that the habit of opium eating has increased within the last five years from 50 to 75 per cent. Never sells the drug without a physician's prescription, but has on an average five or six daily applications for some one of its preparations. It is largely taken by prostitutes."

"Has six habitual customers, who take in various amounts the different preparations of opium."

"Has but one customer and that a noted Temperance lecturer."

"Has no regular customers, but has a good many purchasers from the country, thirty or forty at the least. Is decidedly of the opinion that the habit is increasing."

The preparations of opium reported as more commonly used are, besides the drug itself, laudanum, paregoric, sulphate of morphia and, occasionally, McMunn's Elixir. When a more prompt and stimulating effect is desired, as is often the case with those who have been addicted to alcohol, laudanum may be preferred. The sulphate of morphia seems to be growing in favor, its color and less bulk facilitating concealment, and being free from the more objectionable properties of opium. This salt is not only taken internally, but is sometimes used hypodermically. In one case reported in Boston, the whole body was covered with the scars left by the punctures of the injecting instrument. Paregoric is also largely used as a stimulant, although, as a sedative in nursery practice, it has been to a great extent superseded by the so-called "soothing sirups," in which opium is the active ingredient, as it is also in the various other abominable compounds which pass under the name of cough sirups, pectorals, cholera medicines, pain killers, etc.

Our Scituate correspondent reports that infants in that town are unmercifully drugged with soothing sirups.

In Winchester, also, these nostrums are mentioned as quite common, having quite displaced paregoric in the nursery. The basis of what is known as Winslow's Soothing Sirup is morphia. A recent analysis of a sample of this medicine gave one grain of the alkaloid to an ounce of the sirup; the dose for an infant, as directed, being four or five times that usually regarded as safe.* Godfrey's Cordial is also used for a similar purpose, containing more than a grain of opium to the ounce.

It is unnecessary here to enumerate the fearful consequences of the prolonged and excessive use of opium. If less marked in its immediate effects than alcohol, it is far more sure of its victim. Interfering, by its peculiar action upon the nervous system, with the processes of waste and repair, and with the important functions of digestion and secretion, its poisonous effects sooner or later begin to be apparent in the gradual emaciation, shrunken skin and sallow countenance. Enfeeblement of the mental powers, as well as of the moral sense, follows in its course, and the patient ultimately sinks into a condition of wretchedness and often of terrible and hopeless suffering, succeeded in the offspring, if such there should chance to be, by insanity or other form of nervous disease, and not unfrequently by an aggravated taste for every form of stimulant. Among the more common evidences of moral deterioration, are kleptomania, as noticed by at least one of our correspondents, and a marked propensity to untruthfulness.

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* Opium and the Opium Appetite.

It is said that longevity among opium eaters is by no means rare, and not a few elderly persons are reported by our correspondents, who are addicted to the habit; but it is more than probable that, in these cases, it was contracted at a period when length of life was already assured, and when stimulation, unless excessive, is less liable to be followed by the baneful effects of earlier indulgence. "The man who at twenty takes opium," says Poqueville,* "seldom lives beyond the age of thirty or thirty-six."

It may be added that the opium habit is rarely recovered from "Having used the drug for some time," runs a Chinese edict, "the men accustomed to it can by no means relinquish it; their faces become as sharp as a sparrow's, and their heads sink between their shoulders in the form of a dove; the poison flows into their inmost vitals, physic cannot cure their disease, and repentance comes too late for reform." It has been estimated that about one in six of those addicted to alcohol reforms, while among opium eaters success in such an attempt is extremely rare.

The consideration of a remedy for this habit, if such there be, hardly falls within our province. We may, perhaps, be pardoned the suggestion however, that, based as it is upon a craving that no laws can eradicate, the allowance of those milder stimulants, everywhere in use in Continental Europe, might aid, at least, in lessening the consumption of both alcohol and opium. It is an instructive fact that, in the history of legislation, whether against opium, alcohol, tobacco or coffee, for all have, at different periods, been the subjects of legislative enactment, in no instance has the end sought been reached. Substitution, or successful evasion, has been the immediate consequence of all such efforts. In countries where the culture of the vine prevails, drunkenness and opium eating are comparatively almost unknown. It is certainly not unreasonable to suppose that the permitted use of the lighter wines, and, among malt wines, of lager beer, and the promotion of wine manufacture would tend to the prevention of the latter habit, and, in time, go far towards solving the vexed question which of late seems to have disturbed the public mind.

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* Travels through the Morea and Albania.

SEWING-MACHINES.

By Arthur H. Nichols, M. D.

THE EFFECTS ON HEALTH OF THE USE OF SEWING-MACHINES MOVED BY FOOT-POWER.

This inquiry relates specially to the influence of sewing-machines, driven by foot-power, upon the physical condition of women, and has been undertaken in pursuance of a general plan adopted by the Board of Health with the view of ascertaining, if possible, the influence exercised by certain professions, trades and occupations upon health and longevity, as well as to learn to what extent the so-called " industrial diseases " prevail in this State.

The history of the sewing-machine is interesting, as showing how by slow and gradual steps, and by the independent efforts of different individuals, this triumph of mechanism was finally perfected. For many years efforts had been made to construct an apparatus, which should produce an automatic imitation of sewing. The earlier machines contrived for this purpose were made to grasp a needle as in hand working, push it through the cloth, and pull it out on the other side, but these rude contrivances were not found practically useful. Several later attempts, both in England and France, were in a measure successful, and inventions were patented in both of these countries, which really involved many of the essential features of the modern sewing-machine. Thus a patent was granted in France in 1834 to M. Thimonier for a machine adapted to sewing purposes, which produced, by means of a crochet needle the so-called chain-stitch, while in England, a patent for a somewhat similar apparatus was obtained by Newton and Archibald in 1844. In the United States a patent was issued in 1835 to Walter Hunt for a machine for producing the shuttle or lock stitch, while J. J. Greenough obtained in 1842 a patent for a machine using the double-pointed needle, and intended for heavy leather work.

But to Elias Howe, Jr., of Cambridge, is now universally awarded the merit of having invented and introduced to the public the first practical machine suitable for general purposes of sewing, which produced a stitch by means of two threads, a vertical needle with the eye in the point, and a small shuttle for interlocking the stitch. His patent bears date of September 10, 1846, but his invention was made and described several years previously. Mr. Howe's original machine contained many imperfections, the chief of which was in the feeding mechanism and the shuttle, but these were speedily modified and improved, particularly by the invention of Mr. Wilson, known as the rotating hook, designed as a substitute for the shuttle, and combined with a new method of propelling the stuff. Other improvements are adapted for making a variety of stitches or performing some special work, such as making button-holes, but whatever merits they may individually possess, they must all be regarded as modifications of the original machine of Mr. Howe, all being more or less dependent upon the apparatus originally patented by him.

The machine of Mr. Howe having been displayed at various exhibitions, and extensively advertised at a low price, was speedily introduced into general use, effecting a complete revolution in several branches of manufacturing industry, and particularly in the manufacture of shirts, clothing, boots, hats and caps.

With this important accession to the productive force of female labor, the products of their industry have been very greatly augmented. It is estimated that one machine does the work of at least six pairs of hands, and the consequence is that those articles which it assists to make, are now furnished in much greater profusion than before. The abundant supply has effected a very material reduction in the price of these commodities, while their cheapness places them within the means of a larger number. The increased consumption stimulates in turn a demand for an increased supply, and the impulse thus given to manufacture creates a demand for more operatives, the result of which is that the number of persons employed in this industry constantly increases.

Fears were expressed when this machine was first introduced, that it would injure needle-women by reducing their wages and throwing large numbers out of employment, so that in many parts of England its introduction was violently opposed by the trades unions. It is stated, for instance, that at Stafford, where women are extensively employed, the agent of the Howe machine having attempted to introduce it to their notice in the market-place, was assailed by a mob and compelled to leave the town, while as recently as in 1864, complaint is made in the "London Times" that the use of the machine was not permitted to tailors and shoemakers connected with trades unions in that city.

In this respect the sewing-machine has had to contend with the usual objections which have ever been raised against labor-saving inventions; viz., that they create a diminution in the demand for human labor, and thus deprive multitudes of people of employment.

The obvious reply to this allegation is, that, as a matter of fact, experience has demonstrated that the demand for human industry is *not* diminished, but very greatly increased by the introduction of machinery. "The evils necessarily incident to its introduction are slight, partial, and transient. They reach only to the surface of society, affect but small portions of the community, and speedily pass away. The benefits arising from the same source are substantial, universal, permanent. They are seen everywhere, felt everywhere, and must abide forever." In other respects has this invention proved a benefit to the community, for it has brought into existence numerous large factories, devoted to the manufacture of these machines, also of needles and a particular kind of thread, and as the American machines have thus far maintained their superior reputation for mechanical accuracy, general appearance and cheapness, the demand for them in Europe has steadily increased notwithstanding the hostility which was at first evinced. The result of this is, that a new and important addition has been made to our list of foreign exports.

The following table, prepared with great care by Messrs. Wheeler & Wilson, will perhaps express more intelligibly the actual difference in the amount of time required to stitch certain garments by machine and by hand:—

	By Machine.		By Hand.	
	Hours.	Minutes.	Hours.	Minutes.
Gentlemen's shirts,	1	16	14	26
Coats,	2	38	16	35
Silk waistcoats,	1	14	7	19
Linen waistcoats,	–	48	5	14
Cloth trousers,	–	51	5	10
Summer trousers,	–	38	2	50
Silk dress,	1	13	8	27
Merino dress,	1	4	8	27
Calico dress,	–	57	6	37
Chemise,	1	1	10	31
Petticoat,	–	35	7	28
Drawers,	–	28	4	6
Night dress,	1	7	10	2
Silk apron,	–	15	4	16
Plain apron,	–	9	1	26

The sewing-machine had not long been introduced before it began to be alleged that certain ill effects were caused by its use. These complaints, originating among a few workwomen, obtained credence with prominent physicians, and very general apprehensions were expressed as to the deteriorating effects of this labor. Until a few years, however, all researches upon this question have been confined to the experience of a very limited number of women, for the most part those presenting themselves for treatment at the hospitals, or else from a cursory visit to some large workshop, so that the facts elicited would seem insufficient to justify any absolute conclusions.

Dr. A. K. Gardner * as early as in 1860 gave it as his opinion, founded upon many years study of machines of all patterns, that this invention is the greatest boon of the nineteenth century, especially to the female, and that without an appreciable drawback. He avers that no injurious effects whatever are caused by it, beyond the exhaustion which is necessarily felt from this, as from every other overwork. "Finding," he says, "no proof that physical disease originates from, or is even aggravated by, the use of the sewing-machine, I am forced to believe that in the moderate use of the muscles of the lower extremities, the analogy holds good in this as in every other form of labor, that

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* The Hygiene of the Sewing Machine. American Medical Times, 1860.

use strengthens the organs; that while the use of half the body is not so conducive to health, or to an equal development of the entire body, as if the whole frame were exercised, that it is certainly better than no exercise at all, which falls to the lot of the confined hand-sewers."

Dr. Vernois on the other hand, published an article in the 'Annales d'Hygiéne Publiques' * in 1862, maintaining that in the case of both male and female operatives, the movements of the lower limbs produced an irritation of the sheaths and tendons of the extensor and flexor muscles, inducing attacks of cramp, followed at times by partial paralysis, and causing, also, in the case of females just beginning the use of the machine, the development of a peculiar nervous excitement.

Dr. William Ord, in his report on the sanitary circumstances of dressmakers and other needle-women in London (Sixth Report of the Medical Office of the Privy Council, 1863, p. 381), describes the condition of several large workshops where machine work was done, and comes to the conclusion that wherever the work is constant and regular, the influence of the sewing-machine is for the most part beneficial to the workers, inasmuch as they can earn at least half as much again as needle-workers, whether payment is made according to time or by the piece. He is, moreover, of the opinion that the circumstances of the muscles of the limbs and trunk being kept in moderate exercise, associated with the power of procuring good food, tends to improve the health of the machinist. On the other hand, he admits that the cramped position which the operator is forced to assume causes at times pain in the chest and indigestion, while in some other instances headache and giddiness are produced by the constant rattle of the machines. Moreover, a certain class of delicate women, unused to hard living or muscular toil, are greatly exhausted by this particular work, just as a clerk would be by digging. Some such women were seen by Dr. Ord, who according to the evidence of observers, had grown old with great rapidity, at the rate of five or six years in three.

In 1866, M. Guibout, physician to the "Hôpital Saint Louis," in Paris, read a paper before the "Société Médicale des Hôpitaux," in which he gives his experience touching the inconveniences of the sewing-machine, based upon the testimony of a

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* Ann. d'Hyg. Pub., 1862, 2e serie, t. XVII., p. 137.

few operators who had presented themselves for treatment. In this paper he cites several instances of women who had suffered severely from the long continued alternate movement of the lower limbs, and the swaying of the body. The chief ailments complained of were loss of flesh and strength, leucorrhœa and the local nervous irritation alluded to by Dr. Vernois. One of these women, who had been obliged to give up her place on account of these symptoms asserted, "that out of five hundred employed in the factory with her, at least two hundred suffered as she did, so that the operatives were constantly changing, none of them being able to remain long. Those who entered strong and well were soon obliged to leave, weak and emaciated." The opinions of M. Guibout, based upon the doubtful testimony of a limited number of women found wide acceptance in this country as well as in Europe, and not unnaturally excited very general apprehensions that serious physical injuries must result from this kind of labor.

Shortly after this, Dr. Fournier encountered in the hospital a girl 18 years old, affected with a paralysis of sensation of the entire plantar surface of the foot, extending to the deep parts, caused by the prolonged contact with the metallic pedal ; and the extensive publication of this case added to the alarm.

The results of a series of observations made by Dr. Espagne,* Professor at the Montpellier University, upon a portion of the inmates of a public institution in that city, numbering in all 146, were published in 1869. Although the substitution of an artificial motive-power is strongly advocated by this writer, the opinion is expressed that the use of the machine with foot-power does not exercise any general deleterious influence upon the health of those operating it, apart from general fatigue and muscular pain.

It is to Dr. E. Decaisne,† however, that we are indebted for the only extensive inquiries thus far made upon this subject, begun originally among the families of his acquaintance, and followed up among professional operatives, occupying in all the space of about two years.

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* Adolphe Espagne. Sur l'industrie des machines à coudre à la Maison Centrale de Montpellier; Montpellier Médical, mai, 1869.

† La machine à coudre, et la santé des ouvrières; Par Dr. E. Decaisne. Ann. d'Hyg. Pub., 1870, 2e serie, t. XXXIV., p. 105.

These investigations, extending to so large a number of women, and prosecuted in so thorough and methodical a manner, were stimulated, it would appear, by the observations of M. Guibout, and as the conclusions arrived at must carry with them very great weight, it would seem worth while to transfer to these pages a portion of the article.

The total number of women examined was 661, varying in age from 16 to 25, all accustomed to about the same kind of food, and subject to similar hygienic conditions, except that while 380 were employed in shops, 281 worked at home. Of these 380 working in shops, 127 had worked at least three years, 348 at least two years, and 186 at least one year. All were very carefully questioned as to the effects of their work upon the muscular system, the digestive organs, the respiratory and circulatory apparatus, the nervous system and the sexual organs, and with the following results:—

The muscular system.—Here the effects varied with the age of the operative, and the length of time spent daily in work. Thus, in the case of 312 women between the ages of 16 and 25, 104 of these working from eleven to thirteen hours daily, and 21 working from seven to eight hours daily, complained of fatigue, and ill-defined muscular pains, accompanied at times by cramps in the limbs and pain in the region of the kidneys; all of which generally disappeared after a short rest in bed. In 104 out of these 312 the chief trouble was referred to the lower extremities. The fatigue and pain was particularly marked in those who were just beginning the use of the machine, and was much less frequently complained of after a few months experience. In no instance was paralysis of the plantar surface of the foot met with, attributable to the prolonged pressure of the foot upon the pedal.

Of the 226 women between the ages of 25 and 35, of whom 104 worked from eleven to twelve hours daily, and 102 from eight to nine hours, 82 complained particularly of cramps in the legs, 61 of general muscular pains, and 29 of pain in the kidneys. Of 95 women between the ages of 35 and 52, of whom 53 worked from ten to eleven hours, and 42 from eight to ten hours, 18 were found to suffer from cramps in the legs, 14 from general muscular pains, and 61 from pains in the kidneys.

In all these classes it was found that the amount of the fatigue and pain was greatly diminished with increased experience in running the machine. Among 28 women, between the ages of 18 and 40, working from three to four hours daily, but not professional operatives, no ill effects were ascribed to the use of the machine.

Effects upon the Digestive Organs.—Of the 661 women examined by Dr. Decaisne, more than three-quarters complained of disordered stomachs, indigestion etc. The majority, however, admitted having suffered similarly before commencing this work, though they generally maintained that these troubles had since been more persistent. Inasmuch, however, as dyspepsia is found to prevail to an equal extent among operatives of every class, employed for a longer or shorter time daily, it would not appear that any marked effect was produced upon the digestive organs by this particular work.

Respiratory Apparatus.—Dyspnœa, or difficult breathing, is a common complaint among these operatives, but no more so, as was found upon inquiry, than among needle-women in general. About 40 women asserted that the menstrual discharge had been more abundant since beginning this work, while some alleged, that in this respect they had been more regular than ever before. The records of "Hôpital Lariboisière" furnish no evidence that miscarriages are especially common among this class. As to the production of leucorrhœa, 500 women were examined, of whom 306 suffered from this ailment, which in most cases, however, it was admitted, had existed before they began to work.

The general conclusions arrived at by Dr. Decaisne from observations made on these 661 women are as follows:—

1. The effects of this work upon the muscular system differ in no respect from those of any other kind of excessive labor involving the use of certain portions of the body to the exclusion of others. The affections most commonly complained of

are muscular pains, pain in the region of the kidneys, and cramps in the lower extremities; none of which, however, are developed among those working three or four hours daily. These pains, cramps, etc., are most commonly found among beginners, and usually diminish after one has become accustomed to the motion of the machine.

2. Although it is evident that excessive labor must prove a powerful cause of disorders of the stomach in women, we are not justified in accusing this machine with producing those affections of the digestive organs which are met with in so large a proportion of women engaged in any kind of work.

3. Certain affections of the respiratory organs, and especially dyspnœa, are met with in about the same frequency in machine-operators and hand-sewers.

4. The rattle and jar of the machine produces some discomfort at the beginning, but to this noise one soon becomes accustomed, and no ill effects upon the nervous system can be ascribed to this cause, as has been alleged.

5. The peculiar nervous effect caused by the alternate movement of the feet upon the treadles, upon which so much stress is laid by M. Guibout, is, as a matter of fact, of extremely rare occurrence; and even where it occurs, it is seldom the fault of the machine, but is connected with the anterior habits or moral perversion of the operative.

6. Women engaged in working at the machine are not, as has been pretended, more subject than other working women to menorrhagia, leucorrhœa, miscarriage and peritonitis, and the cases of this kind that are quoted, indicate merely the results of work beyond the strength of the individual woman.

7. The use of the sewing-machine, when employed within moderate limits, without overworking, as is too often done, is attended with no greater inconvenience to health than working with the needle, as was shown by the examination of 28 women between the ages of 18 and 40, employed from three to four hours daily.

THE SEWING-MACHINE INDUSTRY IN MASSACHUSETTS.

There are probably few localities in which sewing machines are more extensively manufactured or employed than in Massachusetts; and it would seem therefore that the views of those whose experience here has enabled them to form decided opinions, would possess a particular interest, when compared with the results of similar observations abroad. For this reason, inquiries on this subject were addressed in the last annual circular of the Board to its correspondents, while at the same time personal visits were made to many of the principal workshops, and all possible information obtained from those having charge of the operatives, as well as from the workwomen themselves.

The most obvious and natural method of inquiry would consist in examining carefully a large number of women accustomed to this labor, as was done by Dr. Decaisne, which would enable us to compare the prevalence of particular disorders, and thus work our way to a detection of the remote and proximate causes of these disorders. Experience has shown, however, that outside a hospital or dispensary, very great difficulties lie in the way of collecting distinct and trustworthy information from any very large number of women, owing to the impossibility of conversing with them while at work, or of visiting them in their homes; the delicate nature of some of their ailments; a failure on the part of many to appreciate the utility of the inquiries; the fact that the evidence is given under the eye and influence of the employer,—these and other causes conspire to render the testimony derived from the operatives, so far as the statistics of disease is concerned, very imperfect and inexact.

The evidence of proprietors and foremen, on the other hand, has been obtained from capable and trustworthy persons, most of whom have no interest in disguising the truth, and this latter testimony is the more valuable from the fact that it is so uniform in its character. It is, moreover, strongly corroborative of the views of the great majority of medical men, both here and abroad.

The question asked in a printed circular issued by the Board, was:—"*Have you observed any injury to health from the use of sewing-machines moved by foot power? If so, please to send us all the information you may have on the subject*"

Replies have been received from one hundred and thirty-eight (138) correspondents, representing one hundred and twenty (120) towns in this State and several large cities in other States.

Of this entire number, eighty (80) report one or more instances observed by them, in which ill effects were produced by the use of the sewing-machine.

Fifty-eight (58) return negative or doubtful answers; but it is to be remarked, that the experience of nearly all this number is limited to towns where machines are employed exclusively in private families.

The following are extracts from the replies of the various correspondents.

Replies from Physicians in Massachusetts.

"Although I am aware that much diversity of opinion exists among the members of our profession regarding the effects produced by the use of sewing machines, I have for a long time been convinced that they not unfrequently, when used for a long time, cause serious physical derangements; and such an opinion I have expressed at our Society for Medical Improvement.

"Quite a number of cases in which pain and lameness in the back and thighs, dyspepsia, leucorrhœa, vaginitis, menorrhagia existed, I have attributed to their employment. In some cases relief has been surprisingly rapid after their use has been discontinued, and as rapidly retarded by their reëmployment.

"Unquestionably, the woman running her sewing machine at her own dwelling, would be much less likely to suffer than she who is exposed to the *close air* and *stated hours*, and many other inconveniences which are not unfrequent in the various workshops."

"Sitting in an inclined position, while the clothes are laced tightly, causes dyspepsia and constipation. This, together with the continued moving of the limbs, causes uterine diseases."

"Not hurtful unless when work is excessive."

"Almost without exception, *some* injury to health has followed the constant use of a machine for any considerable extent of time. The complaints are chiefly weakness and pain in the knees, hips and small of the back; affections of the urinary apparatus (producing sometimes scantiness, sometimes increase), and in many cases uterine derangement; leucorrhœa and ovarian neuralgia; ulceration of the os uteri seems also to be induced by the constant running of the machine in tailors' and dressmakers' shops."

"Machines are common in families, but I have heard no complaint of injury."

"I have met with the greatest number of diseases from this cause in my dispensary practice, especially among tailoresses, and to a less extent among the girls who sew for dressmakers.

"The most common disease I have seen is a chronic form of ovaritis, which it is impossible to cure while the girl is working, and which is sure to return even after a long apparent cure, if the use of the machine is resumed.

"If the ovaritis has lasted a long time, I generally find some lateral version of the uterus with congestion and other sequences of this affection. Occasionally I meet with cases of corporeal metritis, and still more rarely with displacements and excoriations of the uterus, that seem to be caused by the use of the machine; but I am inclined to believe that in the most of these cases, the trouble has previously existed in a mild form, and has only been aggravated by the use of the machine.

"In looking over my hospital records, I am able to find but one typical case of disease caused by the use of the sewing-machine. Our actual statistics in this respect are meagre from the fact that the girls, though incapacitated for working, are seldom so acutely ill from this cause as to lead them to enter a hospital.

"It is my belief that all women, in whom any tendency to uterine or ovarian disease exists, and who use the machine steadily, are sure to be made ill; and that at least one-half the girls who are apparently well when they begin to support themselves by machine sewing, become its victims in the course of a year or two.

"Among the patients of a higher class, who only use a machine occasionally, I am almost always obliged to forbid its use, so long as the slightest uterine or ovarian disease remains, as its use for only an hour a day is sure to be followed by an increase of all the bad symptoms.

"The use of the machine during menstruation is especially injurious. I have even known a case where a severe attack of ovaritis and retroflexion of the uterus followed its use during a single menstrual period."

"We have in this town a large number of sewing machines, but as there is no one that obtains a living in this way, I have observed no injury therefrom."

"I think I have observed a greater tendency to dysmenorrhœa and other uterine troubles among those who use the sewing-machine for a living than among others."

"I have several times observed marked injury resulting from the use of sewing-machines. The effects have been dysmenorrhœa, leucorrhœa and back-ache."

"I attribute the poor health of one young lady to the use of a sewing-machine. She has great loss of physical power, pain in lumbar region and knees. A moderate walk is sufficient to bring on pain."

"A greater tendency to dysmenorrhœa and other uterine troubles observed among those who use sewing machines for a living."

"One correspondent has obtained the opinions of twelve of the practising physicians of his city. Two of these have observed well marked uterine disease, miscarriage and threatened miscarriage, malposition of the fœtus, flexion and prolapsus uteri, as effects of too constant use of the sewing machine. Others have seen less direct results, such as debility."

"I have often prohibited the use of sewing-machines, when the individual has consulted me on account of weakness or disorder of the loins or pelvic viscera."

"I have never observed any injury to health from the use of sewing-machines that could be demonstrated; that is to say, those that use them steadily are subjected to such depressing hygienic influences, crowded in rooms with bad air, long hours of labor, deficient sun-light, &c., &c., that any injury to health might with as much propriety be attributed to these causes as to the sewing-machines."

"Cases of unmistakable injury very frequent a few years ago, causing marked irregularities of the menstrual function and their usual sequelæ. The almost universal introduction of steam-power has greatly diminished this class of cases."

"Sewing-machines in general domestic use, but without ill effects so far as observed."

"I have observed great injury from sewing-machines. I have seen cases of leucorrhœa, and even prolapsus uteri, which seemed to have their origin in this employment."

"I have thought that females using sewing-machines were particularly subject to uterine diseases and spinal troubles."

"Many sewing-machines are used here. As it is a rather prevalent opinion that they injure those who use them in their daily work, I have made inquiry of three or four young women who thought they were injured, as to the manner in which they were affected. Pain in the back, exhaustion and faintness were the conditions complained of. No uterine disease or disturbance was named. All the persons alluded to were feeble women whose strength would be easily exhausted by any continuous labor. The daily use of machines moved by foot-power is exhausting work."

"There is one family of four girls in this town, not one of whom can run a machine an hour without bringing on excessive leucorrhœa."

"I have known uterine diseases caused and aggravated by protracted use of sewing-machines."

"Sewing-machines are used in shoe manufactories; driven by foot-power, they are a pest, causing pain and weakness in the hips and back, with leucorrhœa, inflammation of the uterus, debility and general derangement of the health. The operators are learning this by experience."

"I have seen two cases so marked that it became necessary to desist entirely from the use of the sewing-machines. It caused uterine irritation, leucorrhœa, &c., and in one case a nervous irritation corresponding to that described by M. Guibout."

"One case of functional uterine disease, and one of general debility observed; both subsiding on discontinuing the work."

"I can recall the case of a young woman who stitched boots ten hours daily, was obliged to desist in consequence of cough, pain in the back and loins, and scanty menstruation, apparently developed by her work."

"I have noticed an increase of preëxisting uterine disease."

"The health of many females is undermined from this cause, principally by too much confinement and lack of fresh air."

"Excessive backache caused by sewing-machines."

"Should think uterine diseases were much increased."

"I have attributed much debility to the use of these machines. I have a patient with bands of adhesion running from the uterine neck to the posterior wall of the vagina, which I believe to have been produced in this manner. The patient ran a machine three years, and was quite well previously. She has been married several years and has no children."

"I have entertained the opinion that impairment of digestion and of the general strength has taken place from this cause."

"I have met with a case of uterine trouble with profuse leucorrhœa, much aggravated by the use of the sewing-machine."

"For a few years past, I have had my attention called to the effect of these machines, and I think they cause much disturbance of the pelvic viscera, particularly engorgement and congestion of the uterus."

"Hundreds of cases under *general* supervision. Cannot now recall particular cases, at it was several years ago. Lameness of back and limbs quite common now. Nervous disease or depression aggravated in a few cases by overwork on machine. Some cases of uterine disease aggravated by excessive sedentary occupation. No specific effects of machine noticed. Miscarriage never observed. Consumption, general and nervous debility aggravated by machine work. Less lameness of back and limbs since introduction of steam-power. If women work fewer hours they suffer less illness at home than in the work-room."

"Some complain of inability to run the machines, saying that it causes pain in the back, loins and legs; and some have told me that it always causes leucorrhœa."

"I have had well attested cases of spinal irritation, metritis and cystitis, caused by running sewing-machines."

"I have had but few opportunities of observing the effects of the use of sewing-machines upon the health. So far as I am capable of judging, I should say that the women operating them suffered no special ill consequences, but experienced merely the usual results of sedentary labor."

"Although my attention has not been called particularly to the class of cases mentioned, I have seen instances of leucorrhœa, that were aggravated by working the sewing-machine. * * * The introduction of steam-power has lessened the amount of illness in sewing workrooms. * * * There is less illness among those who work the machines at home."

"I have forbidden their use in a few cases, thinking they were the cause of uterine difficulties."

"In one shop where foot-power is used, uterine disease seems to have been developed in several instances."

"The tendency seems to be to produce a weakness of the back or want of muscular power in a marked degree, impeding locomotion."

"In several cases, weakness and pain, more or less constant, in back and thighs, have occurred following the use of sewing-machines."

"I have observed cases in which severe nervous symptoms were consequent on too continuous use of the machine; repetition always followed by recurrence of symptoms."

"No ill effects observed other than those traceable to sedentary employment."

"Constant and long continued use of sewing-machines moved by foot-power tends to induce functional diseases of the uterus." An instance reported in which "three girls working in the same shop ten hours daily for two or three years now suffer from dysmenorrhœa, from which they were formerly free."

"Disease of the pelvic organs, lameness of the back, extreme nervous debility and miscarriage have fallen under my observation, as the results of the persistent use of the machines."

"No ill effects observed; machines are used only for domestic work."

"I think I have seen uterine diseases aggravated by the protracted use of sewing-machines."

"Uterine difficulties and nervous derangements are often observed in those who use the machines daily."

"I believe the daily use of the sewing-machine pernicious to health, but it depends somewhat on the kind of work; it is most injurious where much dust is inhaled."

"The only persons known to be injured are those who have job-work at their own homes, and who work a great number of hours with the machines. With such there is a general failing of health, which rest has soon restored."

"I have seen two cases of what I called chronic muscular lameness of the abdominal muscles from long continued and closely applied use of sewing-machine moved by foot-power."

"In one or two cases, the effect has been to develop pulmonary disease in those having a previous tendency to the same."

A correspondent has collected information from several practitioners residing in one town, as follows:—

"I have had several married and unmarried women consult me, who complain of severe and persistent neuralgic pains about the pelvis, with general poor health, anæmia, palpitation and pain in left side, who were using the sewing-machine quite extensively. These symptoms were obstinate under treatment, and it was only after they had given up the use of the machine that they were relieved."

"I have seen leucorrhœa, menorrhagia and abortion caused by use of sewing-machines moved by foot-power. I think I have seen ovaritis from the same cause. I am confident that ill health in some form inevitably follows the protracted and constant use of the treadle."

"Young ladies tell me that the close application and the excitement of running a sewing-machine make a great strain upon the nervous system. I have recently had one case of sciatica in a large, strong, handsome and happy woman who was serving as an accountant, and also working a sewing-machine a great deal. The disease subsided under rest, blisters and aconite; it returned when she resumed the sewing-machine, and was again relieved after the rest, etc., as before."

"I think it very wearing and laborious work, and the general health often breaks down. I have seen no satisfactory evidence that it induces any special local disease."

"I believe that I have repeatedly seen uterine diseases aggravated by constant use of the treadles of sewing and other machines."

"From general observation, believe the use of sewing-machines with foot-power positively injurious."

"In my opinion, the use of sewing-machines operated by foot-power is frequently detrimental to health, and I have in several instances noticed marked improvement from their disuse."

"As generally used, they appear to be a benefit rather than an injury."

Replies from Physicians in other parts of the United States.

"I have for several years recognized the fact that the use of the sewing-machine produced the various uterine affections. It also aggravates existing uterine disease. In my opinion there is less illness since the introduction of steam-power. I think, moreover, that there is less illness among those who work at home, than in those engaged in workshops."

"I have known some diseases produced by running sewing-machines by foot-power. Uterine diseases—leucorrhœa, displacements and inflammations—appeared to be aggravated. Lameness of limbs and back often observed."

"I have investigated quite a number of cases, where diseases were produced by running sewing-machines by foot-power. Among these diseases I have noticed several cases of lameness of limbs and back, menorrhagia, dysmenorrhœa, amenorrhœa, leucorrhœa, displacements, and, in professional operators, a tendency to rheumatic affections of the lower extremities, and soreness of the muscles; also, quite a number of cases of nervous disease, as well as those in which uterine inflammations had been aggravated. I have frequently observed that where ladies are subject to uterine diseases, these troubles are invariably aggravated after much use of the domestic sewing-machine, as in the spring and autumn. There is less intercostal neuralgia and lateral curvature of the spine among the women in the work-rooms since the introduction of steam-power, as both arms are now equally exercised. There is less illness among those who operate sewing machines at their own homes than among those who work in shops, as the former do not work so constantly, nor under so great a pressure."

"I cannot say that I have seen, in sound women, any particularly bad influence. The class who use these machines are usually subjected to confinement, excessive labor, bad air and diet, etc., and most of them would be ailing under similar circumstances without the machine, at any other vocation.

"It is very common for me to see women of the better class who are already complaining of uterine maladies, reproducing or aggravating their symptoms by this kind of exercise; but any other kind of fatigue would also be prejudicial.

"There can, however, I think, be no question that from the constrained position, etc., etc., the labor of a sewing-machine is bad, particularly in case of uterine maladies."

"Many cases investigated. I have been chiefly engaged in teaching medicine in different medical colleges in the United States during the last twenty years. I have often seen cases in consultation, where there was reason to believe that 'lameness of limbs and back, dyspepsia, lung disease, nervous disease or depression, menorrhagia, dysmenorrhœa, amenorrhœa, leucorrhœa, displacements, inflammations and miscarriage,' have been caused by the use of the sewing-machine by foot-power. I have no doubt whatever that this employment among females is more powerful and efficient in the production of disease of various kinds in that sex than almost all other causes combined. Many of the diseases are also aggravated. Much less illness among women in work-rooms since the introduction of steam-power; and much less illness among those using the machines at home."

In prosecuting these researches into the sanitary condition of machine operatives, visits have been made to many workshops in Boston, Salem and Lynn, embracing all the different branches of this industry, and especial attention has been given to the health of the women, as ascertained from their own evidence and that of the proprietors or foremen, as well as from their physical appearance; their hours of labor, their earning and the means adopted for ventilation. To all these places I have obtained ready access, and have invariably been treated with civility. The following description of some of the establishments will indicate how wide a range of difference there exists in all these different circumstances :—

1. A work-room connected with a large wholesale and retail dry goods and furnishing establishment, in which about thirty women are employed between the ages of eighteen and thirty; of this number ten do machine-work. The apartments are warmed by steam and the air is fresh and pure. A dressing-room communicates with the work-room, in which are conveniences for washing &c., The average earnings are stated by the proprietor to be $7 to $8 a week, where payment is made by the day; $8 to $12 a week by the piece, work in the latter case being inconstant. Hours of work from 8 30 A.M. till 5 P.M., with one hour out for dinner. The women are without exception neat and well dressed, and appear to be in fair health, though not robust. The following are extracts from their written evidence as to the effects of their employment :—

A.—"Has worked three years at the machine; average, eight and one-half hours daily. Has experienced no ill effect, except fatigue when she works unusually hard."

B.—"At sewing machine ten years; eight and one-half hours daily. Has suffered constantly from pain in the back, so that on two occasions she has been obliged to give up work entirely. Complains also of nervous prostration and general debility, but she finds that all these troubles disappear after a few days rest, so that by taking a vacation of a few weeks each year, she is able to continue at her work. Always enjoyed good health before commencing to work."

C.—"Six years at sewing-machine; nine hours daily, always well before working. Now suffers from dyspepsia and general debility. Is greatly relieved by rest in bed."

D.—"Has worked three years (though not constantly) eight hours and a half daily. Suffers from pains in the back and shoulders when she works steadily. These pains disappear when she suspends work."

E.—"Six years at the machine; average eight and one-half hours daily. Was perfectly well before beginning to work. Has since been troubled with pain in the shoulders and back, and indigestion. Obtains great relief whenever she can get a few days' rest."

F.—"Has worked three years, from nine to twelve hours daily. Complains of pain in small of back and physical prostration."

G.—"At the machine six years, eight and one-half hours daily. Perfectly healthly before commencing to work. Is now troubled with cramps in the limbs, and indigestion. From the latter she gets but partial relief, even when favored with a short vacation."

H.—"Has worked during the busy season only, one year and a half, eight hours and a half daily. The only ill effects experienced have been pains in the limbs, which leave her as soon as she stops stitching."

I.—"Has done machine work between eight and nine years, working from eight to nine hours daily. Never knew a sick day before beginning to operate, but considers that her health has been seriously impaired by this labor. Complains principally of indigestion. Is unable to continue at work throughout the year without taking a vacation."

J.—"One year and seven months at machine work; nine hours daily. Previously well and robust; and now suffers from pain in the limbs and dyspepsia. Rest affords some relief."

2. An establishment for the manufacture of clothing, shirts &c. The average number of operatives employed is seventy-five, and every possible attention is paid to their comfort. In going to and from the work-room, which is in an upper story, they are expected to make use of the elevator. When ill they are visited by the superintendent. Hours of work from 8 A.M. to 6 P.M., with one hour out at noon. Income $8 to $9 a week, working by the day; working by the piece, many are able to earn $1.50 a day. The average price paid for board is $6 a week. The superintendent states that he has had on the average fifty machine operators under his supervision for a number of years, and has also had the opportunity of watching during the same period an equal number of hand-sewers. His opinion is that the effect of machine labor is injurious where foot-power is used, and that only very strong women are able to work constantly for any length of time without experiencing some ill effects, which are generally aggravated at the menstrual period, and women who have persisted in their attempts to work at this time have not unfrequently fainted at the machine. He has observed in some instances that stout, robust women coming in from the country to obtain employment have declined

in health very rapidly soon after beginning this work. The complaints most frequently heard are of pain and cramps in the lower extremities, pains in the back, and diseases peculiar to women. The hand sewers, he thinks, are exempt as a class from special diseases, and suffer less from fatigue. Complaints among them are rare, and long continued employment produces no such effects as those above described. The machine operatives on the other hand are constantly changing, some being able to hold out two or three years, but very few longer than this. Steam-power has recently been applied to the machines in this establishment, and with its introduction, a marked change has been noticed in the condition of the workwomen, so that the former complaints are rarely alluded to. Operatives are naturally unwilling to work in those establishments where foot-power is still required, provided they can obtain employment where steam is the motive-power. With the aid of steam, 850 stitches can be made in a minute by the Wheeler and Wilson machine, 500 being the maximum obtained by foot-power. With the Wilcox and Gibbs' machine the difference is still greater.

3. A manufactory of cloth gaiters in Lynn. Work-room in the upper story; present about forty women, the majority of whom appear sufficiently healthy, but some look thin and pallid. Hours of work from 7½ till 11¾ A.M. and from 1 till 6 P.M. or till sunset in winter. Earnings from $5 to $12 a week; now and then a woman can earn $16. Board costs $4.50 or $5.

The earnings for work done in the shop last year amounted to $12,888.16, besides $1.500 paid for extra work done at home.

As the season advances, business improves and more hands are required. The machines used are the "Howe," "Grover and Baker," "Empire" and "Singer." The foreman states that for the past five years he has had constant charge of from fifty to sixty women; running formerly by means of foot-power, but during the past year by steam, so that he has had an opportunity of comparing the different effects of this work upon the same individual. This particular branch of work is less fatiguing than many others, inasmuch as the stitching is not so continuous, a larger proportion of the time being spent in preparing and arranging the materials. Formerly there were frequent complaints of pain in the back and limbs, and not unfrequently the operatives gave out completely. He has noticed there was invariably a falling off in the comparative amount of work done the latter part of the day, owing to their exhaustion. Now no such severe effects are observed, as when the treadle was used, though some still complain of pain in the back.

4. Mr. J. T. is the proprietor of an establishment for the manufacture of boots and gaiters; during the past eleven years has had the personal oversight of from fifty to seventy-five women; formerly running by foot-power, now by steam. He considers the work severe, but still is of the belief that the women enjoyed quite as good health, and lost as little time, as the average of mill operatives or hand sewers. The fatigue experienced was most marked during the first few months, but after they learned how to get the 'balance of the treadle,' and to maintain their bodies in the proper position, the work came easier. When the women have become absolutely ill, he has found this very often to be the result of imprudence on their part, rather than overwork in the shop. They are quite reckless about exposing themselves, and notwithstanding all cautions will persistently go from the hot shop into the open air insufficiently clad, and in wet weather will go to and from their meals in thin shoes. This carelessness seems to him a more probable cause of the lung troubles which prevail among this class. The introduction of steam has tended to lighten very considerably their labor, and has moreover proved in a pecuniary point of view a profitable one to him. It being in the dull season at the time of the visit, work was not going on.

5. A boot manufactory, employing from 40 to 50 women between the ages of 14 and 35. Earnings $8 to $30 a week; the average earn $15. The foreman states that he himself worked continuously at the sewing-machine for twelve years, from ten to twelve hours daily, experiencing no ill effects whatever, nor did he find it very fatiguing. Formerly the operatives at times gave out from excessive fatigue, especially during the menstrual period, and were obliged to suspend work for a few days, but he has never noticed any permanent ill effects. The machines in this shop are now all run by steam, though till

quite recently foot-power was used. Twice each year, in spring and autumn, the shoe trade is dull, so that the operatives are allowed a vacation of three or four weeks, which gives them an opportunity of returning to their homes and recruiting. Many would give out from sheer exhaustion were it not for the chances of prolonged rest in the country thus afforded them.

6. A manufactory of machine-sewed slippers, employing on the average fifteen first-class operatives. The workshop consists of one end of a large loft which has been partitioned off. Warmed by a coal stove. Air tolerably fresh. Ventilation by means of windows, doors and scuttles. The "Singer" machines are used for the most part, and from the nature of the stuff stitched, an unusual amount of force is necessary to drive the treadle. The physical appearance of the women was good. Some were particularly stout and ruddy, and when questioned, affirmed very positively that they experienced no ill effects from their work. All work done by the piece. Duration of labor from 7½ to 8 hours daily. Earnings from $10 to $20 a week each. The majority earn $15 The average amount paid for board $5.50 a week. According to the testimony of the foreman, the operatives are constantly changing, the greater part leaving after three or four months work, and very few remaining as long as a year. For this reason, he is unable to form an opinion as to the general effects of labor on individuals. His general impression is that where the feet are the propelling power, the work is extremely arduous, and if pursued uninterruptedly beyond a certain length of time is absolutely injurious, causing physical weakness rather than any particular ailment. Has never known a woman to break down in the shop, but thinks they may be injured without being aware of it, and he is able to recall several instances in which uterine diseases were developed after they had quit work and become married. He is convinced that it is unprofitable to attempt to carry on this business by foot-power, and it has therefore been decided to transfer, at once, this factory to another building, where steam can be had.

The following testimony was cheerfully given (in writing) by such of the operatives as chanced to be present at the time of the visit:—

A.—"Has worked at the sewing-machine ten hours daily for ten years experiencing no ill effects whatever. Age twenty-seven years."

B.—"Age twenty-two. Has been employed at this work eight hours daily during five years, and is perfectly well."

C.—"Age thirty-five years. Length of time at this employment twelve years, nine hours daily. Complains of pain in limbs and back, and uterine troubles, which did not previously exist."

D.—"Age twenty-four years. Has worked at the sewing-machine eight years, eight hours daily, and in consequence thereof has become greatly reduced in strength."

E.—"Age forty-two years. At this employment six years, daily average six hours. Suffers from pain in limbs and uterine disease, which did not previously exist."

F.—"Age twenty-one years. Has worked at the sewing-machine seven hours daily for two years without feeling any evil effects."

G.—"Age twenty-four years. At this employment seven hours daily for three years, and enjoys good health."

7. A shoe manufactory employing about fifty operatives in the busy season. At present no work is being done. Steam was introduced into this workshop six years ago. The proprietor states that for a number of years he had about thirty women at work with the old treadle. He entertains the opinion that running the machine by foot-power must involve a very severe strain upon the muscular and nervous system, but no more so than the work of mill operatives which requires so much walking. Does not believe that this industry is productive of any specific disease. Since steam-power has been used, there has been much less complaint of fatigue on the part of the women, and consequently they are not inclined to accept work at those shops in which they are obliged to move the treadle. The result of this state of things is that those shops in which foot-power is still retained, have to put up with an inferior class of operatives. The following incident will serve to show the opinion of the women, as to the amount of relief afforded by steam power: A short time ago, it became necessary to make some repairs upon the boiler, which would occupy, it was thought, several weeks, and being at the time pressed with orders, he determined to continue work in the meanwhile by the aid of foot-power. Treadles were therefore adapted to

thirty-two machines, and that number of women were set to work. At the end of the first day, seven of this number gave notice that they preferred to suspend work until the repairs were finished. At the expiration of the second day, six more decided to quit work, and before the week was over, the shop was quite deserted. These persons were perfectly accustomed to both kinds of motive-power, and chose to lose, from two to three weeks' work, rather than go back to the old treadle, and submit to the additional fatigue of providing their own motive-power. He is of the opinion that this labor, although arduous, may be endured nine hours daily without detriment by able-bodied, healthy women, provided they will take sufficient rest at home, and not subject themselves to the additional fatigue incident upon frequenting parties and balls,—a practice which is very common among this class.

8. A workshop for the manufacture of gaiters, situated in the upper story of a large building. Present about twenty women, some few of whom were comparatively clean, but the majority dirty and untidy. Air confined and filled with tobacco smoke. The room is without means of ventilation, except by lowering the windows, and this is objected to on account of the draught. An air-tight stove furnishes the heat. Machines all run by foot-power. The proprietor has never noticed any bad effects originating in this employment, and some of the hands present were said to have worked pretty steadily for eight or ten years.

9. An establishment similar to the preceding; area of workshop in cubical feet, 22,950 ; persons present, 31. As work increases, the number of hands is increased to 50. Area allotted to each individual 453 to 740 feet. Income from $5 to $20 a week, all being paid by the piece. The average earnings last season were $11 a week each. The age of the operatives varies from 15 to 40. Nearly all are single. Room heated and machines driven by steam. Duration of work, 10 hours. The air is close and unwholesome, no means being adopted to maintain ventilation. At times the sashes are lowered by some, I was told, but are soon raised again by others, who maintain that the danger and inconvenience arising from exposure to a cold draught is greater than that incurred by breathing impure air.

The foreman has heard of no especial complaint from these women, and has had no experience with foot-power.

10. A manufactory of gaiters; at present idle, business being slack. Machines all of the "Singer" pattern. The proprietor has been six years in the business employing thirty women. For three years he used treadles, but for the last three years, steam has been the motive-power. The latter is in every respect preferable. Formerly the hands were constantly giving out from physical exhaustion and various ailments. Since steam was introduced, however, they express themselves quite able to work eight hours daily, so that very little time is lost. There are three women connected with this shop, who were absolutely "worn out" by the use of the old treadle, and compelled to give up work. Now they have returned, and have no difficulty in doing full work. In his opinion, women who take work home are injured by their irregular manner of working. Thus, for the sake of spending their afternoons in promenading the street, or visiting, they will drive work very early in the morning and late at night.

11. A workshop similar to the preceding, where foot-power is still used. About thirty women employed stitching cloth and kid gaiters. Average earnings, eight dollars a week, though some can earn three dollars a day. The proprietor is not aware that any especial ill effects are caused by this labor, but admits that he is obliged to put up with a very inferior class of operatives, the better workwomen being attracted to shops where steam is used. The fact of his not employing steam places him in a very dependent position, for the women understand that if they leave, it is with the greatest difficulty their places can be refilled. For this reason he proposes to dispense with the use of treadles as soon as practicable.

12. A work-room connected with a wholesale and retail dry goods and furnishing store giving occupation to fifteen or twenty women, for the most part running light "Wheeler and Wilson" machines by foot-power. A large number of shirt bosoms are made here, of which one woman can stitch from ten to sixteen dozen a day, according to her skill, strength and capability.

For this work the price paid is now but twelve cents per dozen, whereas formerly fifty cents per dozen was paid for the same work. This branch is particularly laborious, much more so than stitching upon woollens, cottons, dress goods, or even leather, since the work being prepared beforehand by others, the motion of the limbs is continuous, giving but little chance for rest. The result is that there are frequent complaints of pain in back and limbs, while uterine affections are common. The hands are constantly changing, about one-quarter of all those employed breaking down in the course of one or two years. Work here is uncertain, and the average earnings do not exceed $6 a week. The forewoman herself was obliged to give up the use of the machine on account of neuralgia of the feet produced by contact with the iron of the treadle.

13. A wholesale and retail clothing store. About fifty persons present in workshop, some being engaged in preparing the stuff, others in pressing the finished goods, but about thirty at machine work, using the old treadle. Duration of labor, eight and one-half hours. Earnings from $8 to $12. According to the foreman, no precaution is omitted here, the observance of which can add to the comfort or convenience of the workpeople. Large ovens have been recently introduced, so that their dinners may be brought in tin pails and served warm with a cup of tea at noon, in case their boarding places are distant, or the weather is stormy. The amount of work exacted, however, makes the labor exceedingly onerous, the result of which is that the women, without evincing any especial disease, undergo a slow physical deterioration, so that they are in a measure unfitted for severe work of any nature. Instances are familiar to him in which they have suffered from leucorrhœa, and other diseases peculiar to women, coming on after they had left the shop and become married, rendering them quite incapable for the performance of household duties.

The following are extracts from the testimony of the workwomen, given in writing at request of the foreman :—

A.—"Has worked at the sewing machine one year and nine months. Daily average nine and one-half hours. Has suffered from various ill-defined complaints which did not exist before entering upon this occupation; has never suspended work long enough to obtain relief."

B.—"At the sewing-machine about three years. Daily average nine and one-half hours. Suffers from pain in back and limbs, and dyspepsia. These troubles did not exist previously, and are relieved when work is suspended."

C.—"Has worked at the sewing-machine about eleven years averaging nine hours daily. Has never experienced any ill effects, but considers her case exceptional."

D.—"Four and one-half years at the sewing-machine, with daily average of nine and one-half hours. Is troubled with pain in back and limbs, so that she is frequently obliged to quit work, thereby obtaining relief. Was free from these complaints before commencing this work."

E.—"Has been employed at the sewing-machine four years and three months. Daily average, nine and one-half hours. Has never been troubled with any disease, before or since."

F.—"At the sewing-machine one year. Daily average nine and one-half hours. Feels pain in shoulder which did not previously exist and has steadily increased. It is relieved when work is suspended."

G.—"Length of time at this employment two and one-half years, with daily average of nine and one-half hours. Has often experienced ill effects from complaints which did not previously exist, but is very well at present, although her circumstances are such as to allow of no rest. Has been advised by physicians to give up this employment."

H.—"Has worked at the sewing-machine five years. Daily average nine and one-half hours. Was in perfect health before entering upon this work, but thinks she shall be obliged to give it up, as she experiences pain in her back and limbs, and her health is fast failing. Suspension from work affords partial relief."

I.—"One year at sewing-machine, with daily average of nine hours. Has suffered to such an extent as to make her consider the work injurious."

J.—"Time of employment at sewing-machine five years, nine and one-half hours daily. Experiences pain in back and side, which continues after she has stopped working."

K.—"Has worked at sewing-machine seven months, averaging nine and one-half hours daily. Complains of pain in her side and swelling of the feet since commencing this work; has never tried the effects of resting for a time."

L.—"Three years at sewing machine, averaging nine and one-half hours daily. Is troubled with cramp in the feet and pain in the side and back. Had none of these complaints before entering upon this occupation; has never had a vacation."

M.—"Has worked seven years at the sewing machine, averaging nine and one-half hours daily. Has very often experienced various ill-effects, which are much relieved when work is suspended for a time. Health previously very good."

N.—"Has used the sewing machine nine and one-half hours daily for five weeks. Suffers from pain in back and side."

O.—"At this employment four years, nine and one-half hours daily, but has never been troubled with any disease."

P.—"Has worked at the sewing machine nine and one-half hours daily for one year. Complains of pain in back and limbs which did not exist before that time. Has never tried the effect of rest."

Q.—"Has been employed at the sewing machine five and one-half years, averaging nine and one-half hours daily. Was previously troubled with dyspepsia, but considers that it has since been aggravated; experiences also pain in back and limbs. Has never been able to suspend work."

R.—"At this employment nine and one-half hours daily for three years. During this time has experienced pain in side and limbs, but has never stopped work."

14. From the forewoman of a large workshop:—

"In charge of work-rooms five years. Three women at a time at work with foot-power machines. Lameness of back or limbs in all who run machines by foot-power; two cases of dyspepsia aggravated; one case of nervous depression seen; two instances of swelled limbs and one of "female weakness" aggravated; the latter whilst on vacation not troubled at all, on return to work same as before."

15. From a manufacturer of machine-sewed slippers:—

"Has had in his employ from fifteen to twenty female operatives for a number of years. His experience convinces him that where the machines are moved by foot-power, the labor is very exhausting, so that the women are not unfrequently forced to abandon work. Since the application of steam, however, as the propelling power, the health of the operatives has improved in a marked degree while the cost of manufacturing has been materially diminished. More work is now turned out in the same number of hours, and with very much less fatigue to the women, so that the same individuals who formerly lost considerable time, owing to the fatigue and pains induced by moving the treadle, now make no complaint, and are able to work uninterruptedly."

16. From the superintendent of a large shoe-shop, employing forty-five machines run by means of steam-power:—

"My opinion is that any woman who runs a sewing-machine by *foot* power, *constantly*, either at home or in a manufactory, will sooner or later suffer from it. I do not believe, however, that it is at all injurious to any woman to do such sewing as generally belongs to one family, on a foot-power machine."

In conversing with proprietors and foremen it is not unfrequently alleged that in certain branches of this industry the operatives are being "worn out," or "used up." With the idea of ascertaining just what is meant by this popular expression, I have taken the trouble to search out and examine several operatives who were reported to have suffered in this manner, and will record the chief details of one case, which may be considered as typical of all.

Miss A., aged twenty, an intelligent, well-educated young woman, belonging to a very respectable family, living in easy circumstances, began to work at a machine at the age of seventeen in a large establishment in this city, being employed upon leather. This work she undertook in opposition to the wish of her relatives, and with the object of earning sufficient money to enable her to continue the study of music. She worked eight hours a day, exerting herself to the utmost, and her earnings were from $2.50 to $3.50 a day, being the most that was paid to any of the hands. Being known to her employer, she was particularly favored in not being obliged to perform much of the heavy labor required of the other hands, such as carrying heavy bundles up and down long flights of stairs. She had previously enjoyed the best of health. From the very first, the effect of this work was exceedingly exhausting, causing pain in the back and particularly between the shoulders. The impure air of the unventilated work-room caused her no little discomfort. Her appetite, which had heretofore been excellent, soon began to fail, and at the same time her strength began to diminish. These symptoms grew steadily worse, so that at the end of a year she was forced to suspend work for a time. After a rest of two months she became sufficiently improved in health to resume her place in the shop, but the ill-effects before experienced speedily returned, and as she persisted in her labor, were greatly aggravated, till at last it was no uncommon thing for her to faint on reaching home after the day's work. At the expiration of two and one-half years from the time of her entering the shop, her condition was such that she gave out completely, and for the last six months has been confined for the most part to the house, though of late she has rallied somewhat. Her own opinion, strengthened by that of the physician is, that she is suffering from no organic disease, but from nervous prostration engendered by prolonged overwork, and she is therefore encouraged to hope that she will in time regain her former vigorous health.

The explanation of these cases, then, would appear to be this: that a gradual loss of vital power may be entailed by the fatigue occasioned by the long continued use of the same muscles. As regards this muscular fatigue, the beginner naturally suffers more seriously, because she has not learned to direct the movements of the foot upon the treadle, nor properly balance the body. In the course of a few months, however, as the motions of the limbs are better understood, a more skilful expenditure of strength is made, and as the muscles now become firmer and stronger, the amount of fatigue experienced is diminished, provided the daily amount of work is not increased. The individual above referred to was no novice, having been long familiar with this labor, but stimulated by a laudable motive, forced herself continually to perform what was beyond the power of physical endurance.

In considering the condition of these operatives, it may be well to premise, that, while they represent different ages and nationalities, by far the greater number were born in this country, and are usually single women between the ages of 18 and 30. The average earnings of those who have learned to work are quite sufficient to enable them to secure good homes, sufficient clothing, and a liberal amount of wholesome food, consisting of three substantial meals daily. The general habits of these persons are almost invariably good, but instead of adopting a style of dress in accordance with their circumstances, there prevails a foolish ambition to clothe themselves as expensively as the wealthier classes, so that a large proportion of their earnings is expended for fineries. Some, moreover, are in the habit, during the winter season, of frequenting balls where late hours are kept, and it is not to be wondered at, if this exercise in addition to their day's work should prove a strain beyond the power of the system to endure. Others have sewing-machines at their homes, and after working nine or ten hours in the shop, endeavor to add to their earnings by evening work, and it would indeed be a matter of surprise, if, under this double pressure, they did not soon succumb from overwork. One woman, for instance, is reported to have worked fifteen hours daily for quite a number of months, until of a sudden she broke down completely, and has since suffered from affections which render her a complete invalid.

It should be observed that there exists a very great difference in the arrangements of the different establishments. Some shops consist of low-studded apartments on the upper floor of lofty buildings, each occupied by twenty to thirty persons, and heated by an air-tight stove to a temperature of 75° to 80°. In these rooms, although the air is often foul, no attempts at ventilation are made except by opening the windows, and no provisions whatever are made for water-closets. In such places it was found that the standard of personal neatness and cleanliness was invariably a low one, and, although the operatives were at the time apparently free from disease, their general appearance indicated the detrimental nature of their surroundings.

It has been demonstrated in England, by Mr. Simon, that the foul and unwholesome air which is apt to prevail where many persons are engaged in any in-door industry, tends to develop a certain class of fatal lung diseases, so that occupations which in themselves may not endanger health, become seriously injurious, and he therefore lays it down as a rule, established by mortuary statistics, and to which there is probably no exception, "that in every district which has a large in-door industry, the increased mortality of the work-people is such as to color the death return of the whole district with a marked excess of lung disease," and "that in proportion as the people of a district are attracted to any collective in-door occupation, in such proportion, other things being equal, the district death-rate by lung diseases will be increased."

It is more agreeable to call attention to other workshops, where all practicable arrangements are made for diminishing the dangers necessarily incident to an in-door occupation, and conspicuous among these are the establishments of C. F. Hovey & Co., Jordan & Marsh, and Macullar, Williams & Parker, all in Boston, where there are spacious rooms, properly heated and well ventilated, with dressing-rooms attached, and in short providing all the necessary elements of health and reasonable comfort. As would be naturally inferred, such advantages do not fail to attract a superior class of operatives.

It should be borne in mind that this industry comprehends several quite distinct branches, and that the ill-effects produced are very decidedly modified by the nature of the material which is being stitched; and this fact, which seems to have escaped the notice of all who have hitherto written upon this subject, will serve to explain the seemingly contradictory testimony of different individuals. Thus, stitching shirt-fronts is generally admitted to be the most fatiguing of all, inasmuch as the stuff is closely woven, and moreover is rendered stiff by the sizing. In the division of labor, this work is previously made ready for the machine, and nothing being left for the operative but this monotonous stitching, no opportunity is afforded for rest or change of position. Then, again, the earnings for this particular work are very small, so that ordinary wages can be made only by the most rapid and prolonged labor.

Woollens are stitched with much greater ease, nor is it so important that the stitches should be exact and even; hence women engaged upon men's and boys' clothing complain less of fatigue than those employed upon shirt-fronts. The least onerous work of all done with the sewing-machine, and that which commands the highest wages, is the stitching of cloth and kid gaiters, which branch is extensively carried on in Salem, Lynn, Manchester and Beverly. In this work the seams are short, and considerable time is required in preparing and arranging the materials, so that the movement of the lower limbs, instead of being continuous, as in the case of those employed upon shirt-fronts, is constantly interrupted. Thus the machine being in motion less than two-thirds of the time, frequent intervals are afforded for rest and a change of posture. Another very important privilege, which this class share, is a vacation of several weeks in the spring and autumn, which most avail themselves of to visit friends in the country. Thus many causes combine to render their labor much less onerous than that of those establishments where work is uninterrupted throughout the year, and hence they are able to keep on year after year, without suffering from those ailments to which others succumb, whose strength and power of endurance are more severely taxed.

It must, however, be apparent, that this unnatural movement of the feet upon the old treadle for eight or nine hours daily, tends to produce in a large proportion of women fatigue, pain, and cramps in the limbs, back and loins, the degree of which will depend upon the physical capacity of the individual, and the material which is being made up. If this labor is persisted in, the result is that a physical deterioration may be induced, the constitution becoming insidiously weakened, in which condition, certain specific diseases, particularly those peculiar to women, may be developed and aggravated by the abnormal amount of blood forced into the pelvic organs, or, if no special disease is developed, their reduced condition is made manifest by the decided manner in which trivial illnesses affect them. These results, it is true, are identical with those induced quite as often by other kinds of excessive labor, such, for instance, as that of mill operatives, and cannot therefore with propriety be classed with the so-called "industrial diseases," such as lead, phosphorus, or mercurial poisoning, or the lung disease of miners, inasmuch as they are to be attributed, not so much to the effect of a legitimate use of the machine, but rather to its abuse from overwork.

Indigestion and want of appetite is a very common ailment among these women, as it is among all those whose habits tend to a sedentary, in-door life, and this must be assigned not to one but to many causes, prominent among which are the foul air of the work-rooms, and the hurried manner of taking meals.

The important question remains to be considered, what means can be suggested to ameliorate the condition of these operatives, and to prevent the occurrence of those ill effects which have been shown to be not inseparable from the nature of the occupation. These may be summed up as follows :—

First. It has been laid down by Mr. Simon as a sanitary right of workpeople, "that whatever work their employer assembles them to do, shall, so far as depends upon him, be, at his cost, divested of all needlessly unwholesome circumstances." The superior physical condition of agricultural laborers, as compared with town artisans, indicates pretty clearly that the open air is a more natural element to man than a confined, impure atmosphere, and work-rooms should therefore be so constructed as to furnish the largest possible quantity of fresh air, provision, of course, being made for protection against draughts. It is therefore not unreasonable to demand, on the part of employers,—

1. That improvements should be made in the internal arrangements of the workshops, and that some method of ventilation should be adopted, apart from the doors and windows, by means of which a supply of pure air may be admitted to the rooms, but in such a manner as not to blow directly upon the operatives.

2. In order to render tolerable the fatigue of this monotonous work, it is important that the hours of labor should be limited, and that the practice of taking home extra work to be done at irregular hours should not be encouraged. While it cannot be alleged that the regular hours of work of any of the large establishments are at present excessive, especially when compared with the amount of labor required in similar workshops in England, allowance must be made for the difference in the comparative physical strength of American and English workwomen, the latter being more robust, and capable of greater endurance, than the former.

3. More time should be allotted for taking meals. The short time allowed by these women for taking breakfast and dinner is a frequent cause of one of their most common complaints; viz., indigestion. Provision should also be made for regular exercise in the open air, than which, nothing is more

essential to the health of persons engaged in sedentary, in-door occupations.

Second. It is now pretty generally conceded, by those who are most familiar with the subject, that the substitution of some new attachment to take the place of the original crank-treadle would render this labor much less onerous. Steam-power is unquestionably the most efficient and economical propelling agent, where a large number of machines are used together, and it is a matter for congratulation that the deteriorating influences incident to this industry have been already so greatly diminished by the almost universal adoption of this agent by the larger establishments.

There are at present on exhibition, at the store of Mr. B. L. Griswold, in Salem, two sewing-machines which are run by means of electro-magnetic motor power, an invention of Mr. J. P. Tirrell of Boston, for which a patent was obtained in August, 1871. The invention of Mr. Tirrell consists in a series of electro-magnets arranged radially in a frame, in combination with a series of radiating arms, placed on one or both sides of this frame, and connected with a shaft, which acts as a circuit breaker, or device for successively making and breaking the electric circuit through the several electro-magnets as the shaft revolves. By means of this ingenious and novel contrivance, a simple and efficient electro-magnetic machine has been constructed of sufficient power to drive a sewing-machine. The speed of this engine may be regulated by moving the frame which supports the electro-magnets in such a manner that the arms are attracted to these magnets with more or less force, accordingly as it is desired to increase or diminish the speed of the engine. The Smee battery has thus far been employed in connection with the magnets, but experiments are now being made with the hope of replacing it with one more compact, less expensive and requiring less attention. This engine has been subjected to severe tests, and has been found equal to the hardest work. I was informed, for instance, that, with the aid of this apparatus, a " Wheeler and Wilson " machine would stitch three thicknesses of cotton at the rate of seven hundred stitches a minute. It has not as yet been manufactured for sale, nor is it expected that it can be offered at a price within the means of the poorer class of professional operatives who take work to their homes, and who stand in the greatest need of some such contrivance. To meet the wants of the latter, several new treadles have been recently brought forward and are now competing for public favor, several of which I have carefully examined, and of these there are two which seem to possess decided merits, and are therefore deserving of especial mention.

The Parsons treadle.—Mr. C. C. Parsons of New York has succeeded in perfecting a very simple and ingenious treadle, which was patented August 17, 1869, the object of which is to do away entirely with the heel-and-toe movement, and substitute for it a swinging backward-and-forward movement of the feet and legs, not unlike that of a pendulum, the point of suspension and centre of oscillation being coincident with that of the knee-joint of the operator. The cradle in which the feet rest can be raised or lowered to adapt it to the operator, and, being moved by the muscles of the legs alone, the thighs as well as the trunk remain absolutely at rest, so that the movement is an easy and natural one, and requires a much smaller expenditure of force than the old treadle. This treadle is beginning to be known in New York, where it is now recommended by physicians, and it is to be regretted that Mr. Parsons has not yet attempted to call public attention elsewhere to its advantages. I have seen four women who have been in the habit of using it irregularly three or four hours daily, and they all affirm that no pain, either in the limbs or back, is produced by its use. One lady states that she has been in the habit of doing the work of a large family for eleven years, using the old treadle nine years, that of Mr. Parsons two years. With the former, an hour's work was sufficient to cause great fatigue and pain in the back ; whereas with the latter she is able to stitch steadily for three hours, experiencing no pain whatever, and only about as much fatigue as would be felt after a long walk. The testimony of professional operatives would be more conclusive, but, so far as I can learn, the invention has not yet been tested in any of the workshops in this vicinity. It is added to old machines at an expense of $5. (See engraving, p. 220.)

The Hall treadle.—The invention of Mr. W. Smith Hall is covered by several patents, the first of which bears the date of June, 1867. It obtained a favorable notice at the fair of the Massachusetts Charitable Mechanics' Association in 1869, and has since come into extensive use in this vicinity. With this treadle the power is applied solely by the downward movement of the foot, which pivots at the heel instead of the instep, while the rate of speed is regulated by the strength of these movements of the feet and not by their number. This renders unnecessary that rapid motion of the limbs, on the part of the operator, which causes the entire body to sway and vibrate. Among the advantages claimed in behalf of this invention, the following appear to be the most prominent:—

1. The great variety of motion allowed to the feet. The machine can be driven by one foot or both, or either alternately, the two foot-pieces being independent of each other. A slow, alternate motion is generally preferred, which permits one foot to rest while the other is being brought down.

2. There are no dead levels. By the aid of the "pawl-and-gib" movement, the crank is entirely dispensed with, and the machine can therefore always be started without the necessity of applying the hand to the balance-wheel.

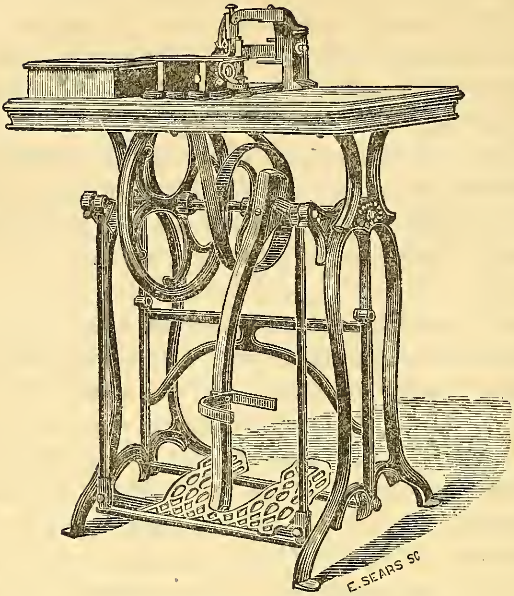
3. The ease with which it is worked. There being no power wasted, much less force is required to move this treadle. To express the actual difference in figures, it has been estimated that while the force required to accomplish 150 stitches by the old treadle is equivalent to that necessary to raise a weight of seven pounds 165 inches, the same work may be done by means of this treadle by the force necessary to raise two and one half pounds 60 inches. (See engraving, p. 220.)

I have taken considerable pains to seek out those operatives who have had the most experience with this treadle, and their concurrent testimony will be found to be very strong in its favor.

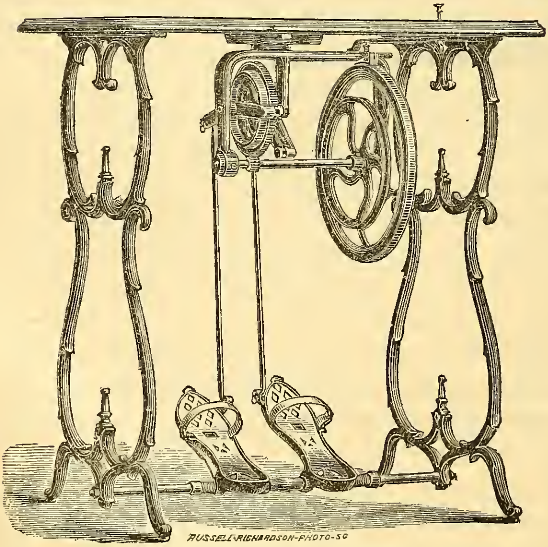
1. An intelligent dress and cloak-maker, short in stature, physically weak, being afflicted with a congenital curvature of the spine, has had above six years' experience with different

machines, working on the average from eight to ten hours daily. The old treadle caused her great fatigue, and constant, severe pain in the small of the back. Has now used the "Hall" treadle for a little over two years, and during this time has experienced no pain whatever from her work. She is, indeed, less fatigued by working eight hours at the machine than she would be after sewing the same length of time by hand. She considers it almost impossible that any ill effects can result from the use of this treadle, its motion is so easy.

2. A well-formed woman of medium height, aged 28, has had eight years' constant experience with sewing machines, and has used the "Hall" treadle the past two years. She has been employed in several large establishments, working always nine or ten hours daily. She states that excessive fatigue and pain in the back were caused by the old machine, so that she was obliged to stop always at the end of every hour and take a few moments' rest. With the "Hall" treadle so little force is required to drive the needle, and so great a variety of movement is allowed the feet, that she is scarcely conscious of putting forth any exertion whatever; so that she now completes her day' work without feeling any pain, and with comparatively little fatigue, accomplishing within the same time one-half again as much work as formerly.



THE PARSONS TREADLE.



THE HALL TREADLE.

GENERAL CONCLUSIONS.

So far as the above returns go, due allowance being made for the exaggeration on both sides, experience in this State seem to justify the conclusions:—

First.—That the sewing-machine may be used by a healthy woman of average strength for three or four hours daily (a length of time sufficient for the work of an ordinary family) without causing excessive fatigue, nor any appreciable ill effect.

Second.—That the illnesses which most frequently prevail among professional operatives making use of the treadle are:—

a. Indigestion, attributable to the unhealthy conditions in which they pursue their occupation, particularly the impure atmosphere of the work-rooms, the sedentary employment, and want of open-air exercise.

b. Muscular pains, affecting the lower limbs and trunk, produced by the long-continued, frequent use of the same muscles.

c. Diseases peculiar to women, aggravated by, rather than caused by, the plethoric condition of the pelvic organs, induced by this exercise.

d. General debility. By this is meant a state of physical deterioration and nervous prostration brought on by overwork.

Third.—That other ill effects, such as neuralgia of the feet from contact with the iron treadle, affections of the spine, as well as the nervous effects described by M. Guibout, are worthy of mention only from their extremely rare occurrence.

Fourth.—The unhealthy tendencies of this occupation may be greatly diminished by the substitution, if practicable, of some other motive-power than that of the feet, or the adoption of one of the improved treadles above described. It is, moreover, of very great importance that, in those establishments where large numbers are congregated, attention should be directed to the proper ventilation of the work-rooms.

SLAUGHTERING, BONE-BOILING AND FAT-MELTING.

By the Secretary.

SLAUGHTERING, BONE-BOILING AND FAT-MELTING.

[A history of the efforts of the State Board of Health to bring about a reform in these processes.]

One of the tasks undertaken by the State Board of Health on its first organization, in September, 1869, was an investigation of the processes in use among us for preparing meat for the markets, and for the disposal of the fats and of animal refuse; that thus the way might be opened for such reform in these trades as would benefit the community in both its sanitary and economical interests. This purpose has been constantly kept in view.

The health of the people demands an abundant supply of wholesome meat, and it also requires that air, which is as truly food for the lungs as is meat for the stomach, shall not be polluted by the odors of animal decomposition whether occurring by natural or artificial methods.

The so-called "offensive trades," we believed, could be rendered inoffensive, and our aim was first, to show how this reform could be made, and then to promote it in every possible way. The success of these efforts is now clearly foreshadowed.

We propose to trace, as briefly as possible, the various steps by which, since our Board was established, the whole subject of slaughtering, fat-melting and bone-boiling, has reached the stage in which it is now presented to the legislature.

The first report of the State Board of Health (January, 1870) contained a report on "Slaughtering for Boston Market" in which reform was urged on the grounds of public health and of economy.

The arguments to show its necessity were drawn from various sources, but chiefly a careful examination of the whole system (or rather want of system) as it existed in the neighborhood of Boston. The Brighton slaughter-barns were shown to be without drainage and surrounded by filth of the most revolting kind, coming from the half-putrid blood and offal. On this disgusting food hogs were fed, destined to make pork for our markets. This, in fact, was the only mode of disposing of the refuse portion of the slaughtered beeves and sheep. The dangers to the consumer were pointed out in the liability to have meats from diseased animals dressed for the markets.

Fat-melting and bone-boiling, as carried on in the vicinity of Boston, were described, and the odors proceeding from these places, as well as from the open vats used for boiling dead horses and other animals, were shown to be sickening and vile, such indeed as no one should be compelled to breathe,—an encroachment, for private convenience, upon the greater rights of the general public who can demand protection from such nuisances.

The remedies for this state of things were definitely stated. They were to be found in the concentration of the business of slaughtering in large establishments, where every part of the animals could be utilized on the spot in the most cleanly and economical manner, without the stench of putrefaction, or the waste incident to transportation and to the use of clumsy processes.

It was also shown that the boiling of animal matters could be conducted in such a way that all offensive vapors should be consumed by fire.

The value of the blood now wasted, and worse than wasted, in filthy pig-pens, was represented to be very great.

It was shown to be capable of conversion into a fertilizing powder, worth more than Peruvian guano, or to be used for the extraction of its albumen, now largely required in the arts.

The report closed as follows:—

"To complete the reform in the modes of slaughtering in the vicinity of Boston in such a way that nobody shall suffer and everybody shall gain, there are needed one or more *abattoirs*, containing all the improvements which European experience can furnish or modern science suggest. They need not be expensive buildings, although they should occupy a large space. They should have comfortable stables for protecting and feeding the animals. As regards the slaughter-house itself, the essential things seem to be,—

"1. A pavement of stone or of some material impervious to blood.

"2. An abundant supply of water.

"3. Complete drainage.

"4. Vats for the 'rendering' of fat and offal on the spot, before putrefaction can attack them.

"5. The means of converting blood into blood-albumen.

"The *sanitary* advantages of such a system would be,—

"1. The removal of the present offensive odors.

"2. The removal of slaughter-house pork from the markets.

"3. The ready inspection of meat, thus insuring the rejection of that which is unfit for food.

"The *economical* advantages would be,—

"1. Diminished liability of having meat spoiled by exposure to the emanations from the putrid pig-pens.

"2. The value of the blood, which would be saved and utilized.

"3. The savings which must always accompany order, system, the division of labor, the avoidance of transportation, and the doing any business on a large scale.

"4. The greatly increased value of land in the vicinity of the present slaughter-houses."

In looking at the above conclusions in the light of two years' additional experience, we believe they are correct. There might now be added to the economical advantages a more distinct recognition of the value of offal, as well as of blood, for conversion into a fertilizer.

The evils with reference to these trades were thus presented in January, 1870, and have been a subject of public discussion ever since. The Brighton butchers evidently regarded our ideas as unpractical, and our remedies as vain. There were other citizens of that town, however, who earnestly desired to be rid of the nuisances by which they were surrounded, and through their efforts a bill was passed by the legislature, of which the following is a copy:—

An Act to incorporate the Butchers' Slaughtering and Melting Association in Brighton, and for other purposes.

Be it enacted, &c., as follows:

Sect. 1. Horace W. Baxter, Horace W. Jordan and B. Francis Ricker, their associates and successors, are hereby made a corporation by the name of the Butchers' Slaughtering and Melting Association, to be located in the town of Brighton, for the purpose of carrying on the business of buying and slaughtering cattle, sheep and other animals, and of melting and "rendering" establishments, subject however to the provisions hereinafter contained, and to all general laws now, or that may hereafter be in force applicable to such corporations.

Sect. 2. Said corporation may take and hold, by purchase or otherwise, such parcel of land, not exceeding one hundred acres in extent, and situated in Brighton, within two miles of the Cattle Fair Hotel, as the state board of health shall by vote determine to be suitable for the carrying on of said business; and said corporation shall within sixty days from the time it shall take any land otherwise than by purchase, file in the office of the registry of deeds for the county wherein said lands lie, a description thereof, as certain as is required in a common conveyance of lands, together with a statement of the purpose for which the lands are taken, which description and statement shall be signed by the president of the corporation.

Sect. 3. The corporation shall be liable to pay all damages that shall be sustained by any persons in their property by the taking of any land for the purposes of this act. Any person, who shall sustain damages as aforesaid, and who shall not agree upon the damages to be paid therefor, may apply by petition for the assessment of his damages, at any time within one year from the taking of said land, to the superior court, in the county in which said land is situate. Such petition may be filed in the clerk's office of said court, in vacation or in term time, and the clerk shall thereupon issue a summons to said corporation, returnable, if issued in vacation, to the then next term of the said court, held fourteen days at least after the issuing of said summons, and if in term time, returnable on such day as the court shall order, to appear and answer to the said petition; the said summons shall be served fourteen days at least before the return day thereof, by leaving a copy thereof with the clerk of said corporation, and upon the return of said summons duly served, the said petition shall stand as a cause in said court, and all questions of fact relating to the damages sustained by the petitioner shall be heard and determined, and the amount of such damages shall be assessed by a jury of said court, unless the parties shall in writing waive their right to a jury trial and agree that the question of said damages shall be determined by the court; and the verdict of said jury, being accepted and recorded by said court, or the award of the court, if jury trial shall be waived, shall be final and conclusive, and judgment shall be rendered, and execution issued thereon, and costs shall be recovered by the petitioner if the amount of said judgment shall exceed the amount offered him for his damage by said corporation before the filing of said petition; otherwise said corporation shall recover its costs.

Sect. 4. Said corporation shall proceed to build upon said land suitable buildings for the slaughtering of cattle, sheep and other animals, and for melting and rendering purposes, and all necessary stables and outbuildings. But no building shall be erected until the plans thereof, with all details of construction, shall have been submitted to and approved by said state board of health, or some person designated by said board to examine said plans. All the business of said corporation shall be carried on in accordance with such regulations as said board shall from time to time establish and furnish in writing to the clerk of said corporation, and for each violation of any one of said regulations, said corporation shall be liable to a fine of not less than twenty nor more than five hundred dollars, to be recovered by indictment against said corporation. Subject to the foregoing provisions said corporation may manufacture and sell any of the usual products of said slaughtering and melting business, or may lease or permit other persons to use their buildings or parts thereof on such terms as may be agreed upon. And each member of said corporation shall have the right to slaughter on the said premises, subject to such regulations and such tariff of prices as said corporation may, by vote at any regular meeting, establish, and to the regulations of the said board of health as aforesaid. And any person engaged in slaughtering or other business on the premises of said corporation, who shall violate any of the said regulations of said board, shall be liable to the penalty herein before affixed to violations thereof by said corporation.

Sect. 5. The capital stock of said corporation shall consist of two hundred thousand dollars, to be divided into shares of one hundred dollars each, and said corporation shall not take any land as herein before provided or commence business until the sum of one hundred thousand dollars at least shall be paid in in cash.

Sect. 6. The state board of health may, if in their judgment the public health shall require, order any person at any time engaged in the business of slaughtering within six miles of the Faneuil Hall Market in Boston, and not upon any island in the harbor, to slaughter his cattle, sheep or other animals, upon the premises of said corporation: *provided*, that thirty days' notice of an intention to pass such an order shall be given to such person by said board, and that after such notice is given such person shall have continued to conduct his business in such a manner as in the judgment of the board is injurious to the public health; and the supreme judicial court or any justice thereof, sitting in equity, shall have power to enforce any such order of said board by injunction. And whenever said board shall make such order as aforesaid, they shall also fix in said order the price per head which said party so served with said order shall pay to said corporation for the use of a place in its said building for slaughtering as aforesaid, but said price may be fixed as a certain sum of money, or as a certain portion of the animal, with its blood and offal, and said corporation shall be bound to permit said party to slaughter on its premises on the terms so fixed by the order of said board, unless said corporation and said party shall agree upon some different terms. Any person aggrieved by any order of the board of health, as in this section provided, shall have the right to appeal from said order in the same manner and with the same effect as such right is now given in chapter twenty-six of the General Statutes to a person aggrieved by an order of a town board of health, prohibiting the carrying on of offensive trades. In case of any appeal as herein provided, the application for a jury shall be made to the superior court in the county wherein the party prohibited transacts his business, if in session in said county, or in vacation to any justice of said court. [Approved June 16, 1870.

This Act met with no favor among the butchers. They declined to have anything to do with it. Not a dollar was subscribed to the stock during the subsequent year.

The legislature met again in January, 1871, and in our report it was stated that the persistent opposition of the butchers had succeeded in blocking all progress. The subject was represented as one of great importance, and the danger of having meat from diseased animals sold in our markets was again referred to as one to which we were all constantly exposed.

In April, 1871, the legislature passed the following Act:—

An Act concerning Slaughter Houses and Noxious and Offensive Trades.

Be it enacted, &c., as follows:

Sect. 1. Whoever in any city or town containing more than four thousand inhabitants, erects, occupies or uses any building for carrying on therein the business of slaughtering cattle, sheep or other animals, or for melting or rendering establishments, or for other noxious or offensive trades and occupations, or permits or allows said trades or occupations to be carried on upon premises owned or occupied by him or them, without first obtaining the written consent and permission of the mayor and aldermen, or selectmen of such city or town, shall forfeit a sum not exceeding two hundred dollars for every month he or they so occupy or use such building or premises, and in like proportion for a longer or shorter time: *provided*, that the terms of this section shall not apply to any building or premises now occupied or used for the trades or occupations before described; but no person or persons or corporation now occupying or using any building or premises for the trades or occupations aforesaid, shall enlarge or extend the same without first obtaining the written consent and permission of the mayor and aldermen or selectmen of the city or town in which such building or premises are situated, in the manner provided in this section.

Sect. 2. Whenever in any city or town, containing more than four thousand inhabitants, any building or premises are occupied or used by any person or persons or corporation for carrying on the business of slaughtering cattle, sheep or other animals, or for melting or rendering establishments, or for other noxious or offensive trades, the state board of health may, if in their judgment the public health or the public comfort and convenience shall require, order any person or persons or corporation carrying on said trades or occupations, to desist and cease from further carrying on said trades or occupations in such building or premises, and any person or persons or corporation continuing to occupy or use such building or premises for carrying on said trades or occupations after being ordered to desist and cease therefrom by said board, shall forfeit a sum not exceeding two hundred dollars for every month he or they continue to occupy and use such building or premises for carrying on said trades or occupations after being ordered to desist and cease therefrom by said board as aforesaid, and in like proportion for a longer or shorter time: *provided*, that on any application to said board to exercise the powers in this section conferred upon them, a time and place for hearing the parties shall be assigned by said board and due notice thereof given to the party against whom the application is made, and the order herein before provided shall only be issued after such notice and hearing.

Sect. 3. The supreme judicial court, or any one of the justices thereof, in term time or vacation, shall have power to issue an injunction to prevent the erection, occupancy, use, enlargement or extension of any building or premises occupied or used for the trades or occupations aforesaid, without the written consent and permission provided in section one of this act being first obtained; and also in like manner to enforce the orders of the state board of health issued under section two of this act. [Approved April 8, 1871.

This Act became operative on the 8th of May, 1871, one month after its passage. Meanwhile the State Board of Health had sent circulars containing copies of the new law to the mayors and selectmen of all cities and towns containing more than four thousand inhabitants, and to the butchers of Faneuil Hall, Suffolk, and Boylston markets. On the 12th of May the Board made an official visit to Brighton and Roxbury, and inspected the slaughter-houses of Messrs. A. Wietz, Dupee, Dyer & Frost, Hollis, Rice, Saunders & Hartwell, Zoller, Taylor, and Jackson, all in Brighton, and the bone-boiling establishment of the Messrs. Ward in Roxbury. After looking at these places, which were taken as fairly representing the beef and mutton butchers and the large and small establishments, it was determined to ask the leading butchers, fat melters, and bone-boilers of the vicinity of Boston to meet the Board at the State House on the 19th of May.

The following are extracts from our records:—

"A special meeting of the Board was held at the State House on Friday, May 19th, 1871, at 10½ A. M.

"Every member was present.

"An address to the butchers of Brighton and other persons, which had been prepared by the chairman and secretary, was read, and adopted unanimously as the opinion of the Board.

"At 11 o'clock a large number of persons, representing the interests of the butchers and fat-melters of Brighton and the vicinity, arrived by invitation of the Board and were addressed as follows by the chairman:—

"GENTLEMEN:—We have invited you to meet us on this occasion in an entirely friendly spirit. We do so in the hope that you and others who may be willing to unite with you for the common good, may be able to attain all the ends aimed at by two Acts, one passed at the last, and the other at the present session of the General Court.

"These Acts have imposed on this Board important duties, and unless you are willing to coöperate with us they must bear painfully on you.

"This Board, as guardians of the public health, brought to the notice of the legislature what everybody who examines it must admit as an established fact, that the business of slaughtering and of fat-melting as now conducted in this neighborhood is fraught with many evils.

"As the result of our representations, and of a petition brought to the General Court the present winter by the authorities of Cambridge, Medford, Somerville, Watertown and Waltham, a law was passed April 8th, 1871, of which the following is one of the provisions.

(Here was quoted the second section of the act previously given in full.)

"You will perceive from this that the public, represented by the legislature, regards your business as now carried on as needing the attention of the State health authorities.

"In a recent official visit made to Brighton this Board became convinced that the mode of slaughtering there practised is now, and must continue to be, a nuisance until the system itself is changed. The opinion is founded on an examination of establishments of all grades. Every one which we have inspected is beyond all doubt subject to the penalties of the present law. Slaughtering has become one vast nuisance to the inhabitants of the town of Brighton, and to transient travellers through the place. There are so many slaughter-houses scattered about that township that it is impossible to provide any adequate drainage, or the means of carrying away or disposing of the refuse without offence.

"The accumulation of filth about the buildings (unavoidable under the present system) brings as we believe every slaughter-house in Brighton under the operation of the law of April 8th.

"Under these circumstances we wish to draw the earnest attention of those most interested in the matter to the laws of the State, and to our duties as a State Board of Health under those laws. We are certainly bound to see them fully carried out. The legislature, representing public opinion on this question, clearly demand it, and we are prepared to execute our whole duty.

"Your own voluntary acts may relieve us from a grave responsibility. By making a radical change in the system of slaughtering, and by carrying out the provisions of the charter granted last year for erecting suitable buildings for slaughtering and for other operations intimately connected with the business, you will save us a painful duty, and confer great benefit on the whole community.

"Let me again say in behalf of the Board that we meet as friends, and that we hope to have, and we hereby invite a perfectly free expression of opinion on all the questions involved in this important matter."

"The reading of the foregoing paper was followed by a free discussion of the whole question by the members of the Board, and by Messrs. Taylor, Jackson, Ward, Hollis, Dyer, Jordan, Rice, Saunders, Upton, and others.

"After an hour's friendly conference the Board of Health retired, and the gentlemen who had been invited to be present appointed a committee of five who, together with the Secretary of the Board of Health, agreed to go to New York for the purpose of inspecting the slaughter-houses and fat-melting establishments of that city, on Wednesday, May 24th, 1871."

This committee devoted two days to the inspection of everything to be found in the city of New York relative to the processes of slaughtering, fat-melting, and refuse-rendering. The visit was most instructive. A report of what was seen was made to the State Board of Health by its Secretary. The following are extracts:—

"We followed written directions received from the Metropolitan Board of Health, and it was soon evident that we began with the worst establishments now suffered to exist in New York. Even these, however, had the city sewer directly under them. These slaughter-houses were only tolerable,—what Brighton might be, minus the hogs and plus the sewerage. We moved on, and presently observed a change. A hog-killing place, on an enormous scale, we found odorless, and scrupulously clean. Seven hundred hogs had been killed there the previous night, and not a trace of blood or offal remained. All the blood had been led, by a simple contrivance, from the sticking-pen into casks, five of which we saw at the door of the establishment, ready for removal. This blood is all caught by a fertilizing company, without trouble to the slaughterers, and they pay for it something over two thousand dollars a year. The offal is removed from this place, and from every slaughter-house in the city, once a day, to the New York Rendering Dock. Hog-pens on a very extensive scale, attached to this and a neighboring establishment, were found scrupulously clean,—wonderfully so. Every provision was made for the comfort of the animals. There were excellent arrangements for ventilation. These pens are of great extent, and beyond all criticism in their sanitary plan. There is nothing to compare with them in the neighborhood of Boston.

"The 'Rendering Dock' was undergoing transformation and enlargement, and was in a bad condition for inspection. We found them putting in some new Lockwood and Everett tanks of great size. Two smaller tanks of the same pattern were firing up for the day's work on dead animals and condemned meat from the markets. They burn up the offensive gases, and give out no bad smells during the process; but owing to the change going on at the works, the lesson to be learned at the Rendering Dock was less striking and instructive than when I was there two years ago. The place was also less neat.

"A Jewish slaughter-house for beeves was next visited. We found it rather dirty. The blood is saved in a clumsy and unsatisfactory way. The proprietor told us that he sold the blood to parties who paid him for it $6,000 a year. He also said that he used the Lockwood and Everett apparatus for his tallow-melting, and that he found the process economical, and the product superior in quality to any he had previously made by the open vats or the condensing tanks.

"We went from here to the Butchers' Hide and Melting Company. This establishment extorted admiration from every one of our party. Here were a large number of cattle in pens as fresh and sweet as a model-farm barnyard. Food and water were in abundance. The animals being driven up an inclined plane (paved), reach corresponding smaller pens, equally clean, in which they await their turn. Not a trace of blood or refuse was to be seen, nor was any offensive odor perceptible. Slaughtering was over for the day at the time of our visit.

"Melting-vats were under the same roof; also hide-salting rooms.

"The melting-vats are steam-tight, and the vapors are conducted through iron pipes into the deep water of the East River. Since I visited the place in 1870, the passage of the vapors is aided by a small engine, which forces a stream of water continually through them, serving the double purpose of cooling the gases and promoting a suction from the surface of the boiling fat. The apparatus seemed to be satisfactory. No offensive odor was perceived in the building; but whether any was caused by the escape of gases at the surface of the East River we had no means of knowing. The accounts received relative to this important point were conflicting.* This mode of dealing with the vapors of fat-melting is at any rate only applicable where the supply of cold water is exhaustless; that is, by the water side. The scrap is pressed into solid cakes, and removed to be used as a fertilizer, or for feeding hogs or poultry. * *

"On Friday, May 26th, we went to the Weehawken Cattle Yards, and thence to Communipaw in New Jersey. This great slaughtering place is out of the jurisdiction of the Metropolitan Board of Health. It is now poorly managed, and has retrograded in a sanitary point of view, as every slaughter-house is sure to do unless closely watched. The slaughter-pens are built out over the waters of the bay. Here, as everywhere about New York, cattle are usually killed by being drawn up by the hind legs and their throats cut. We saw none knocked down, as with us. The Jewish seems to be superseding the Christian method. Blood is saved by putting a tub under the animal's head before cutting its throat.

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* A more recent visit to the premises, and a careful examination of the process, lead to the belief that the vapors from the boiling fat are effectually disposed of in the manner described, and are not subsequently perceived in the air.

"Everywhere in New York it was noticeable that the value of blood as a fertilizer was regarded as great. At Communipaw it was particularly evident, and before we left the premises every member of our party seemed to be convinced that the profits there made through the utilization of blood by various processes (about which there was needless mystery) were well worth having. These processes could not be seen in one of the establishments; in another we saw them in part. They seemed to consist in evaporation of the blood to a semi-solid form, and then treating it with dry phosphate of lime and sulphuric acid. The stench during the process was dreadful,* but the resulting fertilizing-powder was no more offensive than guano, and we were told was worth sixty dollars a ton."

On the 8th of June the following communication was received by the State Board of Health :—

[Copy.]

To the Board of Health of the State of Massachusetts : —

The undersigned, residents of the town of Brighton, County of Middlesex, State of Massachusetts, respectfully represent that they are and have been carrying on therein the business of slaughtering animals; and that, acting in conformity with the spirit of the laws relating to the health of the community, and upon deductions from recent observations of the manner in which the business is carried on in the city of New York, made at the suggestion of your honorable body, they are proceeding to make such changes in the construction of their slaughter houses, and such arrangements for the reception, removal, and final treatment of the blood, offal, and all other waste animal matters as will remedy the causes of complaint that may have existed hitherto, and render their places of business unobnoxious to the comfort and convenience of the community. The improvements in the slaughter-houses comprise the laying of tight floors of materials impervious to moisture, and the giving of these floors the required inclination to shed the blood, water and other matters, into suitable vessels provided for their reception and daily removal from the premises. The vessels will be made of material impervious to moisture and kept perfectly clean and sweet. They are providing also for the use of a sufficient supply of water for cleansing the floors and vessels, and the most efficient antiseptics and disinfectants as supplementary agents of purification. Of these, carbolic acid, chloride of lime, sesqui-chloride of iron and lime will be chiefly relied upon; and these articles will be employed faithfully.

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* It will be seen presently that by a new process blood can be converted into a valuable fertilizer without any offensive odor being given off during the operation.

The greater or lesser quantities of putrescent matters which may have been suffered to accumulate upon their premises will be deodorized and their putrefaction arrested by means of the agents above named, and covering them with peat or charcoal or other material in case these should lack efficiency. During the coming winter, these accumulations shall be removed, after incorporation with enough deodorizing material for the complete removal of their offensive odors in the process of handling. By means of these improvements and agencies, the undersigned are fully convinced that, with respect to the putrescent accumulations, and the offal and ordure from the current business, their premises will be kept quite clean and sweet. But if, after the most thorough use of them, which the undersigned promise earnestly and sincerely to make, their premises should still be obnoxious to a due regard for the comfort and well-being of the community, or reasonably unsatisfactory to your honorable body, they will have to submit without complaining to any regulations your honorable body may lawfully impose; and they would be glad to consider now any suggestions you may be pleased to make as to the conduct of their business upon their own premises, if it should appear that what they purpose to do will prove inadequate. To take care of the blood and offal from the current business of slaughtering, from which alone a nuisance can arise, after the above detailed painstaking with the slaughter-houses, the undersigned contribute largely of their means toward the establishment of the Massachusetts Chemical Company for converting and utilizing animal substances, whose plan of operation, with all other needful particulars, will be submitted for your approval; and the undersigned will not remark upon this company further than to say that it cannot, with its ample capital, skill and experience, fail of the desired end.

In respect of the blood and offal produced before this company shall be ready to manufacture, the undersigned have made such arrangements as must, they think, be satisfactory to all concerned. The particulars of this arrangement also will be communicated to you by the agent of the company. In conclusion the undersigned pray your honorable body to consider that the business of slaughtering has been carried on for many years in the town of Brighton; that the manner of doing it has become somewhat settled during this long period, rendering slow of accomplishment radical and wide-spread changes; that it forms the principal business of the town, and has given the town its prominence amongst the towns of the Commonwealth; and that it ought not to be interfered with detrimentally unless the public good imperatively demands it.

To the butchering fraternity and those connected with them (constituting a large proportion of the aggregate population) whose operations have been centered here from the time when the town had comparatively few inhabitants, the manner in which the business has been carried on (with some admitted exceptions of time and place) has not been more offensive than the same is found to be in other places generally. The undersigned have no evidence whatever that it has been deleterious to health, though they freely admit that with the increasing density of population greater care should be exercised. They beg to remark, however, that since the healthfulness of the town has not been impaired, but the sense of smell merely, and that only occasionally, offended, the increment of population coming to the town fully aware of the kind and extent and method of its chief business have not a cause of complaint so well founded as to justify the compulsory abandonment of the property of the undersigned and the discontinuance of their business or its immediate consolidation under a plan which does not meet their approval; especially just at a moment when, yielding to their own convictions of the present need of some modification, under the pressure of an increasing population and growing intimacy with the adjoining towns, they are making due effort to obviate or remove every cause of complaint.

It remains, then, with your honorable body to determine, in the exercise of a wise discretion, whether the undersigned shall be allowed to go on with their plan for the immediate purification of their slaughter-houses, and the future proper care of the refuse animal matter, and thus utilize the information gained from the visit of their committee to New York, made at your instance, and exhibit their sincerity in the representations made herein; or whether their places of business shall be summarily and indiscriminately closed, their individuality in business destroyed, a serious blow given to the large slaughtering interest, and the community deprived of the benefit of the competition in the trade which it now enjoys, but which cannot exist so well, if at all, under a system of consolidation and coöperation.

(Signed by sixteen of the leading butchers of Brighton.)

Brighton, June 8, 1871.

These proposals met with no favor from the Board. The radical defects in the proposition were as follows:—

1. The impossibility of draining the present slaughter-houses.
2. The impossibility of "cleaning up" the old buildings, whose materials, and even the soil on which they stand, are thoroughly and hopelessly foul.
3. The objection to carting offal and blood through the streets.
4. The absence of any additional security, by inspection, for the quality of meat furnished to the public.

The advantage of such an arrangement to the butchers, in giving them opportunity to save the value of offal and blood, was evident, but there seemed to be no corresponding advantage to the public. The plan was unsatisfactory to the State Board of Health, and from this and other causes was abandoned.

Meanwhile, the operation of the slaughter-house law began to be felt in Brighton. The Board was advised by the attorney-general that, although it might summon the occupants of establishments known to the Board to be offensive, to show cause why they should not be closed, it would be safer to act only on complaints brought before them by third parties. In one respect this restriction was a subject of regret, inasmuch as it seemed probable that it would result in complaints being made against those who were least rich and influential in their respective neighborhoods.

The actual number of complaints received concerning slaughter-houses, and the decision in each case, may be seen by reference to the General Report of the Board, page 2 of the present volume.

In April, 1871, a death occurred in Brighton which served to fix public attention upon the evils and dangers inseparable from the methods of slaughtering there practised. George E. Temple died from the effects of a slight cut or scratch received while dressing an ox which had died from disease, and it was proved at the inquest on Temple's body that half of the diseased animal was conveyed to Boston to be sold as food in the public market. People began to wonder whether they had eaten of this particular beef, and if they were liable to eat similar beef at any time. There was much wholesome alarm. An inquiry was instituted by the city council of Boston, and the dangers to public health from the sale of unsound and diseased meats received a searching investigation at the hands of a joint committee of the aldermen and common council appointed for the purpose. During the month of May there were many sessions of this committee, and the witnesses examined gave evidence of the most conclusive character, all going to show that the public had no guarantee of the quality of the meat they purchased. Animals which had died in the railroad trains from overcrowding, abuse, want of food, or other cause, and animals which had died from disease in Brighton or the neighborhood, were liable to be dressed for the market in the slaughter-barns, and the meat sent to Boston for sale. It was testified that all this had been done in repeated instances. The principal witnesses to prove the facts were those engaged in the business. The testimony of physicians was also given, and they were all of opinion that the remedies for these evils were to be found in a concentration and supervision of the slaughter-houses. The Secretary of the State Board of Health gave evidence that the recognition of meat from animals dead from disease was so doubtful a matter that neither physicians nor butchers could make a decision with any approach to certainty; that to be sure of the health of animals furnishing meat, inspection during their life was required; and that in the forty closed and detached barns now used for killing at Brighton, such inspection was impossible.

A final report of the committee of the city councils of Boston was made in September, and was printed in a pamphlet of ninety pages, giving all the evidence *verbatim*. It is a complete examination of the subject of the sale of unsound meat in the Boston markets, and is of great value.

After the compromise proposed in the letter of June 8th was seen to be out of the question, affairs at Brighton began to wear a more promising appearance.

The hearings on complaints made to the Board continued through the summer, and it seemed not improbable that all the slaughter-houses in that town would be ordered to be closed. No one could fail to see that the State Board of Health was thoroughly in earnest, and would carry out to the letter the duty with which they had been charged in the Act of April 8th.

This, however, was by no means the only reason, or perhaps the principal reason, for a change of feeling on the subject in Brighton. The plan of reform had been thoroughly discussed, and the more it was talked about the less objectionable it looked.

There had always been men engaged in slaughtering who knew that the time must come when population would so increase that a change in the way of transacting the business would be needful. Then why not make it now?

The butchers were being educated up to the point of seeing that their processes were not as good in some respects as were used elsewhere. The visit to New York had convinced every butcher in Brighton that the plan of throwing offal and blood into pens, to be eaten by hogs, was a wasteful proceeding. The value of land for dwellings was every day increasing, and the agitation of this question of slaughter-house reform had probably contributed to the very great advance now perceived.

All these and doubtless other considerations had their weight to overcome the repugnance with which legislation against what were regarded as rights of property was at first received. It is surely not to be wondered at that the people's right to pure air and wholesome meat should not be immediately allowed by men who knew they were only conducting a lawful business in precisely the same way that it had been carried on for a century. It is not surprising that very hard feelings were entertained towards our Board, whose business it was to faithfully execute the law of the State. But gradually the belief that every body would gain and nobody would lose by the proposed reform made steady progress.

During the past three months many meetings have been held by the butchers of Brighton to consider the question. Committees have been appointed to examine all its details. The result of all this has been that the charter for the "Butchers' Slaughtering and Melting Association," granted by the legislature in 1870, has been accepted.

The butchers and the State Board of Health are now working together for the common good, and all parties are interested in completing the arrangements for slaughtering and rendering under the new system with as little delay as possible.

Such changes cannot be made in a moment. They require deliberation, a regard for the rights of property, and a careful consideration of many details of construction. The Board had, in anticipation of what has now come to pass, collected information concerning all the great European abattoirs, and made some preliminary plans adapted to American use, all of which are now at the service of the association, and will aid them in the great work they have undertaken.

More than a hundred thousand dollars (the sum required by the charter), has already been paid in cash to the capital stock, and it is understood that a very much larger subscription can be had when required. The association has been organized by the choice of twelve directors, who are the leading men now engaged in slaughtering for the Boston market.

A very large tract of land on Charles River, just below and opposite the U. S. Arsenal, has been secured for the use of the association, and the location has been approved by vote of our Board, as the law requires. This land has good facilities for drainage, and is so placed between the tracks of the Albany Railroad and the Watertown branch of the Fitchburg Railroad, that animals arriving by these two great lines of supply can be landed, in the one case directly on the ground, and in the other within half a mile.

Here will centre in the future a business of great magnitude, whose influence on the public health and welfare cannot fail to be good,—where it will be shown, as we believe, that slaughtering can be done without offence to any one,—where animals can be readily inspected before being killed, and the purchaser thus guaranteed wholesome meat,—where the fats and the hides can be immediately treated by safe methods,—and where all animal refuse can be converted on the spot, while yet fresh and untainted, into a fertilizer free from offensive smell, and of great commercial value.

All this direct and positive good will quite surely come from the new establishment. But this is not all. Order will take the place of disorder. Violence and brutality will be discouraged. We shall no longer see, in the heat of midsummer cattle and sheep left without shade, or food, or water.

The inspection of animals at the abattoir will tend very strongly to check the horrible treatment which they now so often receive on the railroads, since no animals not in health can be killed.

This inspection will operate, by the strongest of all motives, as an incentive to good treatment of the animals before they reach Brighton from any quarter.

There will be an end not only of the dressing for the markets of animals arriving dead, but also of the "killing of animals to save them" from speedy death by disease.

The Brighton slaughter-house hog will disappear, or will get more wholesome food than he received from the putrid blood and entrails of other beasts.

But the advantages to flow from the abattoir will not stop here. There are, all over Massachusetts, in cities, and towns, and villages, slaughter-houses and bone-boiling and fat-rendering places which are nuisances,—Brightons on a smaller scale, but offensive in the same way—and which good-natured people have borne with, as evils which must of necessity be endured because they could not be cured.

If it can be proved at Brighton that there are methods, both economical and inodorous by which these trades can be conducted, it will be a lesson whose good effects will be perceived far and wide.

What these plans and processes should be at the Brighton abattoir it is yet too soon to explain in detail. But the general principles on which they must be founded are, order or system, and the prevention of putrefaction.

As regards *slaughtering*, whether at Brighton or elsewhere, there are needed building materials impervious to blood, abundant water supply and drainage, and the means of putting every part of the slaughtered animals into a form which will not decompose, *each day*.

As regards *bone-boiling and fat-melting*, if the material to be used is fresh, and unchanged by any taint of decay, the vapors coming from it can be condensed in water, and there are several available plans for doing this without offence, if water is abundant and drainage complete.

If, however, the material is tainted, as is certain to be the case in the waste animal matter collected in a large city, there is no process known to us by which the complex gases thus combined with watery vapor can be destroyed, except by fire.

This mode of dealing with them is effectual—and apparently the only conditions for success are, the having a fire so hot that the watery vapor may not put it out, and delivering the gases at a high temperature.

It is claimed that whoever burns up the gases generated by boiling animal matter must pay a royalty of fabulous amount, but we canno believe that there is any such royal and exclusive road to safety and convenience. Such claims bring all patent laws into disrepute, and would hamper the chemist in the common workings of his laboratory, or even the cook in her kitchen.

But after the "rendering," or the process by which the fats are liberated and the greater portion of the water driven off is completed, there still remain the scraps, or tankings. These scraps have justly had a bad repute everywhere. If not foul when scraped out of the vats, they soon become so. The object has been at all rendering works in crowded neighborhoods to be rid of them at any price at once, as too foul to be dealt with on the spot. They have been usually carried off to some remote place for conversion into "phosphates," and before reaching there, in summer, they swarm with maggots. In this condition they were seen at Communipaw, last May, piled up in barges.

The tankings from the rendering of partially decomposed animal matter is the source of a great part of the vile odor which surrounds bone-boiling and phosphate-making establishments. The smell can indeed be kept down by the use of powerful disinfectants, like carbolic acid, but it costs too much to use them.

The tankings have been usually treated with bone-coal and sulphuric acid, thus converting the phosphate of lime into a material chemically like gypsum or plaster of Paris, and liberating phosphoric acid to form a new combination with the ammonia of the decomposing meat. Ground oyster shells are often added to the mass, which finally becomes a powder like guano, but meanwhile emits an odor which has made phosphate-factories, wherever placed, a stench and a nuisance.

By a new process, the success of which seems to be proved, a similar result is reached without offensive odor, and a fertilizing powder worth $40 or $50 a ton is produced from "tankings," and also from blood, without the addition of chemicals, in the space of one or two hours. This method will be used at the Brighton abattoir, and by means of it, the blood and offal of all the animals slaughtered each day will *in the course of the same day* be reduced to the form of a simple and inodorous powder.

This new and valuable way of treating scrap and blood is, in so far as we have been able to learn, a great improvement upon any method heretofore used either in this country or in Europe. It is effected by a rapid evaporation of the water which is combined with the substances, together with a gradual breaking up of the mass by continued movement. The machine by which this is accomplished consists of a double horizontal cylinder, fifteen feet long and about five feet in diameter, having a hollow shaft, from which project hollow arms, running through its whole length. The materials to be dried, whether blood, or tankings, or any similar substances, are dropped into the inner cylinder by an opening, which is then securely closed. Steam is now introduced into the annular space (an inch or two wide) between the outer and inner cylinders, and into the hollow shaft and arms, which are made to slowly revolve. A current of air, heated by passing through a small furnace, is also blown in at one end of the inner cylinder and passes off at the other end. The contents of the inner cylinder are thus rapidly dried by the high temperature to which they are exposed, and by the current of hot air passing through them, which greedily absorbs the water and blows it off in a cloud of vapor. Meanwhile the revolving arms, and a scraper which is attached to them, have broken up the mass and reduced it to powder. In two hours or less the cylinder is opened on its under side, opposite to the opening by which the refuse matter was introduced, and it falls out, like meal from a grist-mill, dry and ready to be packed in bags. This process was witnessed by a committee of the Butchers' Association, and the Secretary of the State Board of Health, at New Haven on the 22d of December last.

The machine was new, and it was its first trial. The materials operated on were first, *tankings*, of which 1,200 pounds in a very foul state were placed in the cylinder; second, *blood;* third, *fish scrap.*

All these experiments were satisfactory, notwithstanding the fan for blowing hot air through the mass did not work efficiently owing to some trifling defect in its arrangement.

This method of reducing refuse nitrogenous materials to a form in which they can be made ready for use as plant-food without the intermediate loss of ammonia is surely of great value, and the only wonder is, as with so many other simple improvements, that nobody ever applied it before.

If it can be shown at Brighton, as we believe will soon be done by the Butchers' Slaughtering and Melting Association, that the foul odors which have been thought to be inseparable from slaughtering, bone-boiling and fat-melting are avoidable, and that in the final treatment of refuse animal matter the ammoniacal products of decomposition, instead of being wasted to pollute the air, may be saved to enrich the earth, it will be a sanitary and economical demonstration whose good effects will not be limited to Massachusetts.

VEGETABLE PARASITES

AND THE

DISEASES CAUSED BY THEIR GROWTH UPON MAN.

By James C. White, M. D.

1. The Nature of Vegetable Parasites.

2. The Diseases to which they give Rise upon Man.

3. Pseudo-Parasites.

4. Their Growth upon the Domestic Animals.

5. Their Supposed Identity, and their Relations to Common Moulds.

6. Common Sources of Contagion, and Precautions to be Used Against Them.

VEGETABLE PARASITES.

1. *The Nature of Vegetable Parasites.*

The question of the occurrence of low forms of vegetable life upon the external surface of man at times, and of alterations in the tissues of the skin and its appendages in connection with, or in consequence of, their presence there, is no longer a matter for discussion ; it is a fact as well demonstrated as the growth of the lichen upon tree and rock. Concerning the botanical position of these forms, however, their absolute connection with some of the affections in which they are found, the identity of the different varieties, and their relations to the common moulds of decay and fermentation, there still exists a great difference of opinion in consequence of lack of knowledge on these points. The purpose of this paper is to present some account of what is known about vegetable parasites and their effects upon the exterior of man and other animals, and of the present state of information in relation to that part of the subject which is still a matter of theory and under investigation.

At the foot of the vegetable kingdom there exists a large family of so-called cryptogamous or flowerless plants, the fungi, among which the forms under consideration are generally placed, although there are recent writers who would give them a still lower rank in the scale of creation, and, on account of their marked dissimilarity to plants in most respects, would make of them an entirely independent group of organisms. Like many of the moulds, nothing can be learned of their structure by the unaided eye, and in some cases even their existence can only be determined by the high powers of the microscope.

Examined by this instrument, the growths in question are found to consist of elongated, extremely slender, thread-like cells or tubes, more or less branched or intertwined, and divided transversely by partition walls here and there. This, the nutritive or vegetative part of the fungus, is called *mycelium*. It may increase directly by subdivision into cells which have also the power of branching and self-multiplication, or by the production of innumerable, minute spherical or ovoid cells at the ends of certain of its branches, either enclosed in capsules called sporangia, or growing in bunches or bead-like chains, when they are called *conidia* or *spores*. These conidia, when detached, may be found single, united in rows, or divided into compound cells, and each of these is capable of reproducing the mycelium in turn. If these cells or the mycelium be placed in a liquid under proper conditions, their substance, or plasma, as it is called, becomes cloudy and subdivided into innumerable and infinitely small, free cells, which have the power of multiplying by self-division again, and which are either motionless or exhibit peculiar movements among themselves. One of these forms is called *micrococcus*, a term applied not only to what is really known to be the most minute and elementary form of fungus growth, but to much else of indefinite character in the shape of granules detected universally in matter under certain conditions by the highest powers of the microscope. The term is strictly applied to the more or less spherical cells or points,—those which are somewhat elongated and swollen at one or both ends being called bacteria; while those united in minute chains are called vibriones. These are supposed to be the primitive forms of organic life, and are of late much and loosely referred to in the discussions upon the germ-theory of disease. As a phase in the life of the parasitic fungi they claim our attention here.

Placed in suitable fluids these infinitely small cells develop into other and much larger cells of various shapes, which are found either single or united in rows with lateral branches, which increase by budding, and may assume an elongated form like mycelium. They are the submerged form of fungus life, and are known as ferment cells, of which the beer or yeast plant, the wine and vinegar plants, and the milk ferment are well-known examples. This form is capable of reversion to the micrococcus, or under more favorable circumstances probably of attaining to the higher mycelial and conidial development above described. It is a form of special interest from its close resemblance in shape and size and manner of growth to the spores which form by far the greater portion of the fungus growths parasitic upon man, but which are regarded rather as sterile mycelial elements. The forms which demand our attention, therefore, are, to repeat, the cell-like spores or conidia, the tube-like mycelium, and the mycrococcus granules.

These are the forms which make up the structure of the moulds, and the varying predominance of some one or more of these elements, their shape and size, constitute the only distinguishing features formerly recognized among them. Such variations were generally regarded as specific characters, and upon such views mycological systems have hitherto been based, but recent observation has shown that such a system of classification is wholly wrong; that moulds assume a great variety of forms according to the nature of the soil and the atmospheric condition under which they grow; and that many of the most common of those formerly recognized as distinct species are but varieties of some one well-known individual, prevented from attaining their perfect development by the circumstances of their position. Such tendency to variation has been termed Pleomorphism, and must be farther considered in connection with some of the questions above referred to. It is enough for our present purpose to recognize the possibility that the simple spores and mycelium, which make up almost wholly the growth of the vegetable parasites under consideration, are not the only or highest phase of development of which they are severally capable, and that under other conditions they might present appearances so unlike these as to have no apparent connection with them.

The important part which these humble forms of vegetation play in the economy of nature may only be briefly alluded to here. The processes of fermentation by which fruits and cereals are converted into wines and beer, and these in turn into vinegar, by which the sugar of milk is changed to lactic acid, and many other transformations by which new chemical products are obtained, are exhibitions of their influence over the metamorphosis of matter. They are the active agents, too, in those less obvious changes by which dead matter, so called, is resolved into its ultimate elements and converted into a state best fitted for the support of future vegetation.

But it is not wholly upon decaying, or at the expense of inanimate objects, that fungi flourish, nor are the results of their operations always as beneficial as those just mentioned. The existence of the destructive wheat bunt and rust, and of the poisonous ergot of rye, the disastrous disease of the vine, the potato rot, and the dry rot of the hardest oaks, show how such insignificant creations may change the destiny and destroy the health of nations. They prove too that fungi may attach themselves to, and live at the expense of, the living tissues of other plants, and, as Berkeley says, although they may not prey upon cells full of vital energy, life is so depressed by the presence and contact of tissues already diseased, that the healthiest soon fall victims to the deadly encroachment of the spreading mycelium. Upon the higher organization of animal life, too, we find the same destructive agencies at work. The domestic fly glued to the window-pane, and surrounded by its pall of white spore dust, oftenest calls our attention to this fact, and the muscadine of the silkworm has been as destructive to large manufacturing districts in France as the oidium to the celebrated vineyards of Madeira. The well-known spheriæ of New Zealand, objects apparently dried plant at one end, dried caterpillar at the other, furnish another instance of the mastery of their living host by fungi. Such victories of the vegetable over animal life, and the seeming metamorphosis, are foreshadowed by the fabulous transformations of Clytie and Daphne.

The effects which fungi produce by their presence upon the surface of man are never fatal in character or in any way injurious to his constitution; they are, however, the cause of serious deformity and discomfort, as will appear in the following account of the several affections in which they occur. The number of these diseases has been constantly changing since Schoenlein in 1839 first recognized the cryptogamic character of the crusts of Favus, according to the discoveries of observers and the varying views which writers on these subjects have expressed from time to time. There are those who profess to believe in the impossibility of a plant's attaching itself to animal tissues under any circumstances; but such an opinion, as stated at the beginning, requires no notice, as this part of the question is settled. There are others who, from the fact that the spores of various fungi are occasionally detected in the effete scales of Psoriasis, the crusts of Eczema, and in other cutaneous diseases, the non-parasitic nature of which no one questions, claim that their presence in all other cases is equally insignificant. Such a conclusion is as unsound as would be that of a botanist who should deny the cryptogamic nature of the various parasitic growths upon the forest tree, because the crevices of its bark catch and retain the scattered spores which the wind is always sweeping through the air. Then there are certain affections in which fungi have been discovered by some, and not recognized by other reliable observers; the former maintaining that the plant is the cause of the abnormal appearances which constitute the disease, the latter that it is only occasionally and accidentally present. Great difference of opinion prevails therefore with regard to the position of several of these affections, not only as to whether they are to be considered of parasitic origin, but as to their mutual relations among those who claim the latter.

On the other hand, there are three well-marked and important affections of the skin and its appendages which reliable authority universally admits to be produced by the presence of fungi upon and within their tissues, and these will be first considered. They are called Favus, Herpes tonsurans, and Pityriasis versicolor.

2. *The Diseases to which they give Rise.*

FAVUS.

The first of these, Favus, is the one in which, as already stated, the existence of a vegetable parasite was first recognized. It may be briefly described as an affection of the scalp and external covering, characterized by the formation of large, yellow crusts. The shape of these crusts is peculiar, being concave upon their upper and exposed surface, circular or ovoid in outline, and presenting concentric rings rising like the seats of an amphitheatre from the central depression towards the elevated margin as they increase by peripheral growth. In size they vary from a minute point scarcely discernible by the naked eye to flattened masses a half inch in diameter when separate, and an eighth of an inch or more in elevation above the surface of the skin at their edges. Distinct crusts may by confluence, however, form large patches in which their characteristic concavities may be more or less blended and lost. These peculiarities of shape are caused by their seat and the method of their growth. The minute elements of the fungus gain entrance to the tissues of the skin upon which they thrive through the opening of the hair follicle, and from this as a central point extend downwards into the hair canal, and outwards in all directions into the epidermis. At first a minute globular mass is formed, but as the growth increases peripherally it is held down at its centre by the clinging of the hair-sheath to the hair, while in the free epidermal tissues around it is allowed an upward growth. It is the presence of the hair in the centre of each crust, therefore, which mainly causes the concavity of the crusts. Upon the scalp where the hairs are best developed this shape is longest retained, while upon the general surface of the body, where it is much less frequently met with, the crusts when large wholly lose this peculiarity and form irregular-shaped masses projecting to a much greater elevation above the surface. If we remove one of the small and perfect crusts, which is easily done by the nails, or a blunt instrument, we shall find its under surface convex, and that it is seated upon a smooth and shining depressed surface, which soon rises again to the level of the surrounding skin, and reproduces the crust. The color of the crusts when young is bright orange, fading to a pale lemon color when older. The odor is disagreeable, resembling, as it is thought, somewhat that of mice, a significant fact in connection with its frequent occurrence upon these animals. These appearances may be modified by the bursting of the crusts by rough handling and the discharge of their contents, or inflammation may arise beneath them from the same cause, and the pus and blood mingling with them give rise to the formation of large scabs.

There is a stage, however, in Favus, preceding the appearance of the crusts, which is generally overlooked, and which strongly resembles the appearances peculiar to the disease next to be described. This is best studied by observing the effects of inoculation upon portions of skin not covered with hair. This is most successfully accomplished by enlarging the openings of hair-follicles by a needle, and applying to the punctures a drop of water containing favus particles. In a few days a red spot is noticed which is somewhat scaly upon the surface, and increases in size, apparently healing in the centre, as it spreads outwards. Sometimes groups of small vesicles or papules may be seen within the patch. These appearances, so strongly resembling ringworm, may last three or four weeks, and disappear without the production of a true favus crust, if the growth should not chance to enter the canal of the hair follicles seated within its border; but generally minute masses of the characteristic yellow color may be seen, or characteristic favus cups are formed after a while. This early stage is rarely noticed upon the scalp for two reasons: it is concealed by the hairs when present, and the larger development of hair there leads to the more easy and rapid formation of the crusts which obscure it. Favus is so rarely seen upon other parts than the scalp, that this stage is little understood, and when observed has been without doubt mistaken for ringworm in many instances. This error, or an occasional chance coincidence of the two affections upon the same portion of the skin, has given rise to the opinion, held by some dermatologists, that the fungus is the same in both diseases. This is a question, however, which will be considered further on.*

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* During the preparation of this paper I have been watching upon my own arm the growth of the favus fungus, inoculated according to the method of Peyritsch.

On November 2d, material from a favus crust, removed from a patient in the skin ward of the Massachusetts General Hospital was rubbed up with a little water so as to form a thin paste. This was smeared over a portion of the fore-arm, where the openings of four contiguous hair-follicles had been just previously enlarged by drilling into them with a needle. An inch above this spot a needle loaded with the same moistened favus matter was bored into three hair follicles also. The parts were then covered with a piece of cotton cloth, and sticking plaster was applied over all.

November 4th.—The follicles thus treated were red and slightly elevated.

November 7th.—Appearances as on 4th.

November 13th.—Follicles of the upper patch much more swollen than those of the lower, and the skin surrounding both points of insertion reddened.

November 20th.—Follicles of upper patch still more prominent than the others, and the skin surrounding them, half an inch in diameter, considerably swollen.

December 7th.—The dressings, which up to this time had been only momentarily removed for inspection, were not replaced, and the parts were covered simply by the ordinary clothing. Both patches were red and covered with yellow, scaly matter, the borders being somewhat elevated and papular. Some of this matter was scraped off, and the parts were then washed for the first time.

December 11th, four days after washing.—The surfaces of both patches have become covered again with yellowish-white scales, and two of the follicles in the upper patch are quite prominent.

The scaly matter removed from the surface was examined by the microscope, and presented the following appearances: The epithelial cells, of which it mainly consisted, were filled with groups of fungus cells, resembling in all respects those of achorion, and quite unlike those of the parasite of Tinea tonsurans. A very abundant growth of mycelium was also seen running through the masses of epithelium in all directions. One of the lanugo hairs from the patch was also removed, and, after maceration in a solution of potash, was found to be permeated by favus cells throughout.

December 27th.—The parts are still unchanged, except that they are less red beneath the scaly surface, and the elevated margin has flattened down to the general level of the skin. The spots have not enlarged, and no true, characteristic favus cup has formed. They would not be generally considered as favus, if seen without the above knowledge of their history, and they might easily have been mistaken for ringworm.

February 20th.—The skin of the above parts has returned to its natural appearance. The fungus did not succeed in establishing a permanent hold upon the tissues.

Such are the appearances produced by the growth of the favus plant upon the human skin; the effects and symptoms to which it gives rise need but a brief mention. Upon the general surface of the body it causes various degrees of irritation, sometimes sufficient to excite an eczematous condition of the surrounding skin if scratched, or some immobility of the joints of the limbs, if there seated; but generally its presence is productive of little inconvenience. Upon the scalp, however, its effects are of a more serious nature. The hairs soon begin to change in color, becoming gray or white, lustreless, stiff and brittle, and after a while break off at the surface, or are discharged by suppuration with the surrounding favus masses. In this way the disease spreads over the whole scalp in time, the baldness beginning generally at the front and lateral portions, while the hair upon the occiput may retain its position for years. The baldness may be temporary only, in case the hair follicles are not destroyed, but the presence of so much foreign matter within them may give rise to so violent an inflammation that they and the hair-growth are forever destroyed. In this way the firm, white and atrophied condition of the scalp is produced so characteristic of old cases of favus. In some instances atrophy of the bones of the skull even, has been observed. It will be easily understood how, by combing and scratching, or by self-rupture of the crusts, and by the changes of position in the bandages worn to conceal its presence, favus-matter may be transplanted from one part of the scalp to another.

Upon the constitution and health generally favus has little or no effect. It is often seen upon sickly-looking and consumptive children, but such coincidence indicates only neglect most favorable to the progress of both the local and general affection. It may possibly thrive more vigorously upon the devitalized tissues of a person debilitated by consumption, but its alleged connection with this disease or dependence upon hereditary or constitutional predisposition, rests upon no proper foundation.

Favus affects the nails too occasionally; generally in persons either carrying the growth in some other position, or having charge of those affected by it. Their substance, which is only modified epidermal tissue, becomes yellow and opaque, their longitudinal striæ are more marked, and their surface has a rough and tuberculated appearance. The external layers of cells are easily detached, and are found filled with the parasitic growth, while sometimes a well-defined favus mass perforates the nail from below.

If now we examine by the microscope the matter of which the favus crust is composed, upon whatever part of the body it may be growing, we shall find in addition to more or less epithelium, 1st, innumerable, minute cells of an irregular ovoid shape, attached to each other in groups or rows, of about the $\frac{1}{3000}$ of an inch in diameter; 2d, others more or less swollen at one end, or divided or branched; 3d, long and very slender tubes extending from the masses of cells, and more or less subdivided by partition-walls and branched; and 4th, granular matter so small as to be without definite form, even when examined by the highest powers. These objects constitute, it scarcely need be said, the elements of a fungus as already described. The first two forms are the spores or conidia, the third is the mycelium, and the last the micrococcus. They are not distributed evenly throughout the favus mass. The spores predominate in the centre of the cup, while the micrococcus and mycelium are found more largely at its circumference and extending into the surrounding epidermis, which holds it encapsuled. The cells of the skin, in the earlier stage of the disease above described, and likewise the outlying portions in the neighborhood of the crust when formed, will also be found to contain the same elements, although the spores are in much smaller proportion. If we remove the hair which pierces the centre of one of the cups, with its sheath attached, we shall find the walls of the latter distended with innumerable spores and mycelium shooting out into the surrounding tissues. If the hair be one sufficiently long affected to present to the eye the appearances already described, it will be found when examined by the microscope, after maceration in a solution of potash, to be permeated by hollow canals running lengthwise between its fibres, and by beaded tubes extending longitudinally throughout its substance. Rows of conidia may also be seen encircling the shaft of the hair. These appearances are to be traced from the atrophied bulb for a considerable distance after the hair emerges from the skin.

The fungus growth in the nail is the same in all respects as in the epidermal tissues elsewhere. The fungus in favus has always hitherto been called achorion schœnleinii, in honor of its discoverer. Whether it is still to be looked upon as a species peculiar to this disease, as identical with those found in the other parasitic affections of the human skin, or as only a modified form of some common mould, are points to be considered farther on.

Favus is a rare disease in comparison with the affections remaining to be considered. It is mostly met with upon the heads of poor children, for its elements seldom succeed in developing upon surfaces frequently washed or brushed. Although positively contagious, it is so in far lower degree than some of the varieties of ringworm to be described, and it seldom if ever runs through schools and asylums like the latter. It is frequently observed upon several members of the same family, however, and to be developed successively and only after long periods of daily contact amongst its individuals. Its artificial transmission by inoculation is also a matter of difficulty, although recent attempts performed by puncturing the hair follicles for the admission of the fungus have been much more successful than when other methods were used. It affects children more frequently than adults, and is comparatively more common in the country than in cities. Its course is always slow; left to itself it may last a life-time upon the scalp, or until it has entirely destroyed the hair, in which case a spontaneous cure is possible. Upon other portions of the body its duration is by no means so chronic, and its eradication by treatment, compared with its seat upon the scalp, a simple matter. The same happy result might be obtained there, did not the hairs which pierce the crusts retain them in position, and also contain a store of seed which continually gives rise to new life. It is on this account that favus upon the scalp is one of the most obstinate affections known.

RINGWORM.

Under this general name will be described certain diseased conditions of the skin of various parts of the body, so unlike in their appearance as to have been considered distinct affections up to very recent date, and to be still called by different names, and to be the subject of more animated discussion at present, perhaps, than any other point in dermatology. Ringworm of the scalp, called herpes tonsurans or tinea tonsurans; ringworm of the general surface of the body, called herpes circinatus; ringworm of the beard and sycosis, both called "barber's itch" at times, as well as by other names; eczema marginatum, a peculiar affection of certain parts of the body, so called by Hebra in his original description; and the majority of the cases of parasitic disease of the nails, called onychomykosis, are all caused by the growth of one and the same fungus, hitherto generally entitled trichophyton tonsurans. The great dissimilarity in the appearances of these affections is due, as we shall see, mostly to peculiarities in the seat and stages of the parasitic growth.

Ringworm *of the general surface* of the body is familiar to all. It begins as a red spot, slightly elevated above the surrounding skin, which is covered in a few days with minute papules or vesicles of very short duration, or with little white scales. It increases rapidly in size, flattening down in the centre as it expands, so as to form a circular patch, the elevated border of which consists of a ring, an eighth or a quarter of an inch in width, of the same papules, vesicles, or scales, while the central portion appears red and scaly. Thus it goes on sweeping outwards like the cryptogamic fairy ring upon the soil, and forming complete circles sometimes six inches or more in diameter, which then appear as rings simply, as the redness and scaliness of the enclosed skin disappear after a while. Sometimes, however, the disease starts up afresh within the district already-swept over, and rings within rings may be formed. Generally, after reaching any considerable size the disease dies out at certain portions of the border or rim, for want of proper nourishment or suitable soil, and segments more or less broken are left to advance over the uninvaded regions of the skin. Generally, too, new spots appear before the disease has lasted long, the result of self-inoculation, which run the same course. Their seat is most commonly the neck and face, or these are the parts generally the first to be affected from their greater exposure, but the whole surface of the body may be more or less successively swept over before the disease is exterminated, or may exhibit simultaneously the characteristic marks of its presence. When about the face and neck in children it may extend its march to the scalp, and thus give rise to one of the other varieties already mentioned; or in a man it may run through the beard and cause there similar appearances to those upon the scalp of children, or terminate finally in another form, sycosis. It may, however, affect the hairy portions of the face or scalp and for a considerable time, and yet manifest itself in no other way than by the formation of the rings already described. In the latter case the hair follicles have not become implicated, and thus the appearances and course of the disease remain the same as upon non-hairy portions of the body. Occasionally these varieties may be seen simultaneously upon one person and their conversion into one another satisfactorily observed. The sensations which accompany them are more or less itching and burning.

If some of the scaly matter be removed from any portion of the skin affected by ringworm and examined by the microscope, there will be seen mixed with epidermal cells innumerable round bodies $\frac{1}{7000}$ of an inch in diameter arranged in groups and rows, or single, and, sparingly interspersed, long and branching tubes. These are the unmistakable elements of a fungus, and they differ from those found in favus, already described, in the shape and size of the spores or conidia, and the much smaller quantity of the mycelium.

Eczema Marginatum.

There is occasionally observed upon the central portions of the trunk, especially about the inner surface of the thighs and lower abdomen a diseased condition of the skin of peculiar appearance, which Prof. Hebra was the first to particularly describe under the name eczema marginatum. It begins as a small round patch of papules and vesicles, which itches excessively and excites scratching. As it spreads it heals in the centre, sinking down and leaving a dark red, scaly condition of the skin, while the advancing border presents constantly an elevated ridge of papules, vesicles, and other lesions of eczema, upon an inflamed base. The scratching aggravates the severity of the symptoms and tissue-changes, and gives a markedly eczematous appearance to the part. The affection differs from eczema, however, in the central retrogression and the concentration of its activity at the advancing edges. It may extend thus over large and continuous portions of the trunk and limbs, but the appearances never vary from the type of the raised and narrow margin of papules, vesicles, excoriations and crusts, and the dark red and scaly state of the parts earlier affected. New centres of the disease may be developed simultaneously on neighboring parts, and occasionally the same process is repeated within the borders of the old patch; the whole then exhibiting concentric rings of the character already described upon a general field of a dark red color.

This affection has been the subject of much discussion within the last few years. As early as 1864 Köbner of Breslau in his Mittheilungen demonstrated its parasitic nature and the identity of the fungus found in it with that of ringworm of other parts of the body, and maintained that the two diseases were the same. His statements were not received, however, with all the consideration they deserved, and it was not until Dr. Pick of Prag, three years ago, again opened the question with still more positive proofs of the correctness of Köbner's views, that they were generally adopted by dermatologists. But why is it, it may be asked, if eczema marginatum is identical with ringworm, a very common affection, that there has ever been this doubt as to its nature and this reluctance still on the part of Prof. Hebra to regard the fungus found in it as the essential agent in its production, although obliged at last to admit its existence there? How does it differ from ordinary ringworm of the skin? Only in the more eczematous character of the lesions which compose the outer and active rim, and the greater amount of congestion and pigmentation which remain behind enclosed within it. The parasite in ordinary ringworm creates a certain amount of irritation of the skin, expressed by the formation mainly of papules, vesicles, and scales. In eczema marginatum the inflammatory process is aggravated, as shown by the addition to the lesions just mentioned of pustules and crusts, and greater exudation beneath where the source of the irritation is most actively at work, namely, at the edge. The deeper color within indicates only a higher grade of chronic inflammation. How therefore can we account for this difference in the degree of inflammation, the exciting cause being the same in both affections? It is evident that it must be due either to peculiarity in position or in the temperament or tendencies of the persons affected. The former, no doubt, is the reason why ringworm of the parts specified should assume the peculiarities described as eczema marginatum, for they are specially liable to a form of eczematous inflammation, and its chronic character will explain why a true eczema of the same parts might at times be converted into this form of disease. No doubt, however, that both position and individual tendencies operate in its production, for we may have ordinary ringworm of the same parts presenting none of the peculiarities of the eczema marginatum form, and on the other hand true eczema may affect them indefinitely as such without becoming accidentally inoculated with the fungus of, and converted into, ringworm. Eczema marginatum, then, is to be regarded either as ringworm of certain parts exciting an eczematous inflammation in addition to the lesions ordinarily produced by itself, or as ordinary eczema modified by the subsequent development upon it of the parasitic elements of ringworm.

Of the real nature of the affection, however started, there can be no doubt. Removing some of the epidermal cells from the border we shall find by the microscope precisely the same fungoid elements that we found in the scales of ringworm, conidia, mycelium, and micrococcus, although after the disease has existed for a long time they are often difficult of detection. Were this not sufficiently conclusive both as to its parasitic nature, and its identity with ringworm, we have in addition the experiments of Köbner and Pick, both of whom succeeded in producing unmistakable ringworm upon their own skins by transplanting some of the scales from cases of eczema marginatum, and the observation of many that ordinary ringworm has been seen to become converted into eczema marginatum after existing some time.

This disease is not of very frequent occurrence. It has been observed by Hebra to affect especially shoemakers and horse-soldiers, occupations most likely to add an eczematous character to a ringworm existing upon the thighs, or to generate a local eczema of the parts for the later engrafting of parasitic elements. The disease occurs also upon other parts than those already mentioned; in and about the axillæ, for example, and upon the female breast. In India it is of not unfrequent occurrence, and is there called Burmese ringworm. The subjective symptoms are an exaggeration only of those above attributed to ringworm of other parts.

Ringworm of the Scalp.

The third variety of ringworm to be described is that seated upon the scalp, and, owing to the presence there of the hairs, its appearance and course differ greatly from those belonging to the forms affecting the non-hairy portions of the skin already mentioned. It is called Herpes tonsurans or Herpes tondens by the various writers on skin diseases, just as ringworm of the skin is called Herpes tonsurans or H. circinatus, although in no way allied to true Herpes. It would be better to adopt the title Tinea tondens or tonsurans, to correspond to Tinea favosa, the most acceptable title for favus. The terms *tonsurans* and *tondens* suggest the most striking feature of ringworm of the scalp, as the disease first manifests itself by the falling of the hair in circular spots, although not close to the skin as if shaven, as in alopecia areata, an affection to be described below, but by breaking off one or two lines from the surface and leaving the irregular stumps to project. The surface of these circumscribed patches is harsh, owing to the projection of the hair follicles as well as of the stumps, and from the thick coating of dry and diseased epidermal cells and the parasitic elements present. This, however, is not the first stage of the disease, although that which first attracts notice. It is preceded generally by the same appearance of circles of erythema, spreading outwards and healing at the centre as in ringworm of the skin, but without as markedly elevated a rim as in the latter. These, being concealed by the hairs, generally escape observation, and it is only by watching the development of new points of inoculation, as the disease progresses, that its early stages may be generally studied. After gaining a hold upon the epidermal cells, as shown by these manifestations, with which we are already familiar, the fungus soon affects the hairs; they become dry, lustreless and brittle, and break very easily, leaving the stumps projecting from the prominent follicles, as already described. As the disease spreads outwards from its central starting point, large, bare spots are formed, several inches in diameter, which may coalesce and thus give rise to a very large and continuous patch; or many separate points scattered over the scalp may give a spotted appearance to the whole head. Thus the outlines of the affection are constantly changing in every case, but the minute and surface appearances of every spot are always the same, viz.: the stumps of hair, the white scaly matter, and the prominent follicles resembling shagreen, or the skin of a plucked fowl, as variously described by writers.

If the patches increase in size sufficiently to run down upon the neck or forehead, where there are no large hairs, the appearances change abruptly to those of ringworm of the skin; and on the other hand should, in a case of the latter, the affection sweep from the face on to the scalp, there are at once developed the characteristic features we are describing. It is by no means uncommon to observe both forms of the affection upon the same child; that is, the tonsurans upon the scalp and the circinatus upon the face forming continuous parts of one large ring, or to find in one child of a family the scalp affected, and upon the skin of another child or of the parent well-marked circles of ringworm.

Occasionally, however, other appearances are observed, which must be referred to individual temperament. When the irritation produced by the parasite, generally of slight character, is excessive, vesicles and pustules of considerable size may arise upon the affected parts, which terminate in thick crusts; or in other cases large nodules or tumors may be developed from the inflammation of the hair follicles, sub-epidermal abscesses, which open by several mouths and for a long time discharge a glutinous matter; a condition similar to that observed at times when the beard is affected, as will be seen below. Such cases may give rise to partial and permanent baldness, but fortunately they are rare.

Left to itself ringworm of the scalp, like favus, tends to perpetuate itself indefinitely. The hairs repeatedly fall and are reproduced, until the soil contains no more nutriment for the plant, or the follicles are obliterated by inflammation, in both of which conditions a local spontaneous cure of the disease results. It will sometimes apparently disappear more or less entirely, but almost always acquires new life, and thus may go on for years unless arrested by treatment.

If we pull out one of the hairs changed as described, and examine it by the microscope, we shall find the bulb much changed in appearance, flattened and distorted or, perhaps, wholly destroyed; the shaft, or all that remains of it, irregular in outline, and its free end splintered and jagged, like the uncut portion of the stump of a tree. The various structures of the hair are scarcely distinguishable, and the longitudinal fibres are distended and forced apart by the parasitic growth. This is seen to consist of an innumerable number of spores or conidia, covering the outside of the hair, and penetrating its tissues throughout its length. But little of the myceloid growth is seen. The epidermal cells surrounding it, and those which make the scaly matter covering the general surface of the bald patch, are likewise filled with the same elements. These are identical in appearance with those already described as discovered in the other varieties of the disease.

Ringworm of the scalp is a frequent affection among children, and often occurs upon the same individual and at the same time with ringworm of the general surface. The one may readily give rise to the other upon another person. In adults, however, it very rarely affects the scalp, and it may exist for months upon the hairy portions of the face, and extend from these parts over large portions of the body without appearing upon the head. Indeed, I have never seen but one adult thus affected, while the beard in gentlemen, as will be explained in another connection, is very frequently the seat of ordinary ringworm. Unlike favus, it is of more frequent occurrence in cities than in the country. It is in orphan asylums that it is most commonly found, and the introduction of a child affected with it is often the cause of an outbreak which may spread among scores of the inmates and last for months, before it can be exterminated. It causes some degree of itching, and, as just stated, occasionally a circumscribed inflammation sufficient to destroy the hair follicles, and thus produce partial baldness, but it does not affect the health in any way.

Ringworm of the Beard.—Sycosis.—Barber's Itch.

Ringworm of the beard presents very unlike appearances at different times, so dissimilar in fact as to pass generally for entirely distinct diseases. As just stated, it is in one form a very common affection among young men, and its real nature is then readily recognized even by the patient. The latter appearances are those of ordinary ringworm of the chin and those of the scalp affection just described, more or less combined, and are called simply ringworm. They may be designated as the

First Stage.—It begins, as upon the non-hairy portions of the face or body, in the form of small points, which generally attain the size of a pea or a cent, before they attract much attention. They spread rapidly in a circular form, flattening down in the centre as the elevated margin of papules or vesicles enlarges, and are accompanied by a considerable degree of itching and burning. The centres of the patches remain more or less reddened and scaly, but seldom present the white, branny look, so characteristic of their seat upon the scalp; probably because the parts are so much more frequently washed. The sides of the face are its most common starting-point, from which the rings may spread in every direction, or new ones may be started from these upon other parts by self-inoculation; the itching causing frequent rubbing with the hands, and in this way transference of the parasitic elements elsewhere. When the circle spreads beyond the beard, the appearances of such portions of the patch are identical with those of ringworm originally started upon the general surface of the skin. The disease may thus run on for some time in the beard without any apparent change in the hairs, but sooner or later, the period varying greatly in different cases, the hairs begin to fall from the parts affected, thus defining the patches more conspicuously than before. The hairs break off a short distance above the surface, and leave ragged stumps, as on the scalp. Ringworm of the beard primarily occurs generally upon those parts of the face which are shaven, or in other words upon those persons who are shaved; much less frequently upon others, for reasons to be hereafter given. On this account it seldom exists long without attracting attention, and its effects and changing phases may be carefully studied. It may extend from the shaven portion of the face into parts of the beard worn long, or, beginning in the form of herpes circinatus upon the neck, spread upwards into the long hairs of the face, but it seldom primarily gets a seat in a full beard. The fashions of wearing the beard, or the methods of shaving practised by the barbers in different countries, may have much to do with the comparative frequency of occurrence of this stage of ringworm of the hairy portions of the face among various nations, certainly a great difference in this respect exists; German writers, including Prof. Hebra, saying that simple tinea tonsurans of the beard seldom if ever occurs in their large cities. In France, on the other hand, it is spoken of as more prevalent. Here at any rate it is of very common occurrence, as will be shown in connection with the subject of the causes of the parasitic affections of the skin. It often apparently disappears, to revive again and again, and thus may run on indefinitely even for years, when left to itself, or when unsuccessfully treated. Occasionally, however, other appearances are added to the typical symptoms of the affection above given. After existing thus for months, possibly for a year or more, the beginning of those lesions of the skin becomes manifest, which characterize the second stage of the disease. Simple ringworm of the beard becomes in other words,

Sycosis. Second Stage.—This is an affection about which there has been even more difference of opinion expressed among dermatologists than in the case of eczema marginatum and its relations to ringworm. This has arisen from the circumstance that there are two affections of the beard closely resembling each other in appearance, but due to different causes, which are confounded with each other, and which bear no distinguishing titles. Sycosis may be defined in general terms as a chronic inflammation of the hair follicles of the face. It begins in the form of a small nodule about the insertion of the hair, which slowly enlarges and, if the inflammation runs high enough, discharges pus from its summit, which dries and forms a crust about the hair. This process is repeated in the individual follicles several times generally, the nodules varying in size and prominence according to the degree of inflammation. In later stages the nodules and pustules may be converted into hard and large, prominent tubercles, giving rise to thicker crusts upon their surfaces as they suppurate, or forming large, raw indurations. The tissues beneath the skin may in time become involved and large abscesses be formed. Thus the disease may go on for months or years, spreading gradually over the hairy portions of the face, and affecting sometimes the eyelashes and eyebrows. When the inflammation is excessive, the hair follicles thus affected are destroyed and permanent baldness results. Great disfigurement and local distress are often caused by it. It forms one of those chronic affections of the beard known as barber's itch.

Now it is about the *cause* of this affection that the difference of opinion above mentioned has arisen. Gruby was the first to suggest its cryptogamic character, and called the parasitic elements found microsporon mentagrophytes, mentagra being another name for the disease. Hebra and other distinguished German observers failed to discover the presence of a parasite except in very rare instances, and therefore consider its occurrence purely accidental, and in no way connected with its production. They regard the disease, therefore, as simple acne of the beard. The French observers, on the other hand, insist upon its parasitic character, but regard the fungus found as the trichophyton tonsurans, the same as that common to all the varieties of ringworm we have described, or in other words that sycosis is merely Herpes tonsurans of the beard, its final stage. There can be no doubt of the accuracy of this latter view in part, nor are the opinions of Hebra and others wholly wrong. There is a parasitic form of sycosis, there is a non-parasitic form of sycosis. Köbner, who has done so much to clear up the doubts concerning this class of affections and this disease in particular, calls the former Folliculitis barbæ, the latter Sycosis parasitaria, and his investigations show that the latter form is by no means so uncommon in Germany as the statements of other observers teach, although there can be no doubt that it is much more prevalent in Paris and Boston than in Vienna; a fact, taken in connection with the more frequent occurrence in the two former places of simple ringworm of the beard, of important bearing upon its relations to the latter. Köbner bases his opinion, that parasitic sycosis is only the worst and most advanced stage of Herpes tonsurans, upon the following observations, stated in brief: 1st, the fungus found in both is identical in form, size and distribution; 2d, the transfer of the crusts of sycosis to the skin of the same or of another individual produces Herpes circinatus and on the other hand, of material from this, or from the head in ringworm of the scalp, to the beard of another person causes sycosis; and 3d, parasitic sycosis generally begins with ringworm of the beard.

The latest study of the disease has been made by Prof. Tanturri, whose observations may be found at length in the Italian and German journals of dermatology. His conclusions are stated in abstract in the latter as follows: 1. Herpes tonsurans generally precedes the development of phytosycosis. 2. Phytosycosis is not an accidental symptom, but the direct consequence of Herpes tonsurans. 3. Phytosycosis is still contagious, even when Herpes tonsurans no longer exists. 4. The parasite of phytosycosis is found in the hair which penetrates the nodules and pustules, and also around it; and, 5, is identical with that of Herpes tonsurans. 6. Phytosycosis is distinguished from the idiopathic sycosis by its morphological, clinical and anatomical characters. These important points of distinction cannot be given here in detail, but may be found in the journals referred to, and are also minutely discussed by Köbner in his valuable work. It must be said, however, that in many cases the mere appearances at some periods would be insufficient to distinguish the parasitic from the non-parasitic inflamation of the hair-follicles, and that the clinical history and, most important of all, the microscopic examination, are aids in diagnosis never to be discarded, sometimes indispensable. That parasitic sycosis is the latest stage of ringworm in the beard, I have no doubt remaining, for I have watched the conversion of the one into the other in several cases.

Ringworm of the Nail.

The last form remaining to be described is ringworm of the nails. Occasionally some one or more of the nails of persons affected with any of the varieties above described, or of those having the daily and long-continued care of such patients, lose their transparency, become opaque and dry, and gradually thicken. Their surface appears rough, and cracks easily, and their free edge is blunted. Their substance is brittle, and flakes off superficially in the form of scales. If these be examined by the microscope, the flattened cells of which they are composed will be found filled with a parasitic growth, consisting of long chains of conidia, more or less branched, of a few slender myceloid tubes without septa, and of small round cells or spores. Such a condition continues for years or perpetually, unless the plant is destroyed by treatment. Such cases form one of the varieties of so-called onychomykosis, a name applied to all the parasitic affections of the nails, of which, also, the favus form, already described, is another. Whether there be in fact other varieties than these two, dependent upon the growth of other fungi than those found in Tinea tonsurans and T. favosa, is a matter much discussed, but not easy of solution, because the growth of the plant in nail substance is very unlike its modes of development in the other cutaneous structures; so much so, that without the clinical history, it is often impossible to say to which of these varieties any case shall be referred.

PITYRIASIS VERSICOLOR.

The other remaining parasitic affection of the human skin, concerning the cryptogamic nature of which no doubt exists, bears the above name. It is also called by some writers Tinea versicolor. It is characterized by the formation upon the surface of yellowish or buff-brown spots of irregular outline, but slightly elevated, and covered with fine scales, which are easily scratched up by the nails, or removed by scraping with a knife. They vary in size from minute points to confluent patches of sufficient extent to cover large portions of the chest or abdomen. They chiefly affect the front trunk, beginning generally upon the chest, and may extend downward so as to cover more or less wholly the abdomen, hips, and upper thighs, and upwards to the shoulders, and thence down to the forearms, or creep around the chest to the back. They rarely appear below the knees and elbows, or ascend upwards upon the neck, and never affect the face. In other words, they do not generally grow upon those parts of the skin which are exposed to the air and light, finding rather upon those parts protected by clothing the warmth, and possibly the absence of light, essential to the development of the plant. It seldom, if ever, occurs upon children, which may be explained, perhaps, by the choice the parasite shows for the dry and outer cells of the epidermis, those of adult life being probably better adapted in this respect to its needs. It is said, also, to occur less frequently upon women than upon men; but it is not unfrequently communicated from husband to wife, and flourishes as vigorously upon the female skin, when once started, as upon the male. When once established, it seldom disappears spontaneously, but may go on for years, perhaps dying out largely during the winter, to revive and extend over wider areas during the summer. It often gives rise to great itching of the parts affected, although in some cases the patient is not conscious of its presence through any sensations it may cause. It is often mistaken for, and confounded with, the pigment stains upon the skin called moth, liver-spots, or chloasma, an affection differing from it in position, anatomical seat, course, and clinical history.

An examination by the microscope of a few of the scales, so easily removed, from a patch of pityriasis versicolor, will readily establish its nature. We see lying between the upper layers of epidemal cells countless numbers of round conidia or spores, grouped in clusters, of high refractive power, and resembling minute oil globules. Associated with these are fine tubes of mycelium running in a net-work of endless intricacy. About the opening of a hair follicle the parasite may be seen reaching down the canal, and possibly it may run over the surface of the hair; but it never penetrates it deeply or alters its structure. This plant has been generally called microsporon furfur. Its relations to the other parasitic fungi will be spoken of in another place.

The disease is of not unfrequent occurrence here, although its presence is frequently overlooked by its host, and is only discovered by the physician when examining the naked chest for other reasons. It is on this account that it has been said to affect consumptive patients especially. There is no other ground, however, for such an opinion. Its growth is entirely independent of, and unconnected with, the general condition of the person it affects, nor does it exert any injurious influence upon the same, save the itching it occasions. It is positively contagious,—husbands giving it to their wives, as above stated, and as also proved by direct experiment. The spread of the disease from one portion of the body to another is likewise affected by the transplanting of the spores in the furrows ploughed up in the healthy epidermis by the nails while scratching. Still it is not by any means so easily communicated to new hosts as the tricophyton tonsurans, nor is it so easy to trace the source of contagion in any particular case. The color it imparts to the skin is a property of the fungus, as much as the yellowness of the favus crust belongs to the achorion.

Thus far in our subject there has been either no doubt as to the cryptogamic nature of the affections considered, or, if difference of opinion upon this point does exist with regard to some of them, the weight of evidence is such as to overrule such difference in the direction already stated. But we now have to refer to an affection, which is still one of undecided position, and concerning the nature of which dermatologists differ widely in opinion.

ALOPECIA AREATA.

Alopecia circumscripta. Area celsi. Porrigo decalvans. Tinea decalvans.

These are the names given by different writers to this singular affection, which is characterized by the existence of circular, bald spots, of a smooth and shaven appearance upon the scalp, apparently whiter than the surrounding skin. Before it is discovered the disease has generally attained considerable headway, and one or several bald spots, the size of a dime or larger, first attract the attention of the patient or of other members of the family. These increase more or less rapidly and may coalesce, forming large bald patches many inches in diameter, or even in time spread over the whole scalp. The eyelashes may be lost in the same way, and in rare cases all the hairs upon the body are destroyed. The baldness thus produced is not always permanent, and the hair may be reproduced spontaneously even in part, but generally the new growth becomes affected in the same way and falls again. If we examine the surface of one of the patches in its early stage, we shall find no vestige of the hair upon it, and its limits sharply defined by apparently sound hairs. Sometimes the scalp feels thickened or œdematous over the bald spot and somewhat beyond and around it, and occasionally with this is associated a slight erythematous blush. In later stages there is often a partial restoration of the activity of the hair follicles, and in place of the normal growth of the part, lanugo, or short and colorless, downy hairs are produced. When the disease has existed for a long time, years it may be, these in turn may disappear, and the scalp may present over its whole surface that bald and shining, alabaster whiteness and smoothness, so characteristic of senile atrophy of the skin, divided off into separate districts, perhaps, by spare lines and tufts of hairs untouched by the disease.

What is the cause of this strange affection? In 1842, Gruby discovered in the hairs of a case a fungus which he called microsporon audouini; and as the clinical history of the affection favored this view, and as the plant was seen and figured by other competent observers, it was generally accepted by dermatologists that it was of a parasitic nature. Inasmuch, however, as observation since then, and especially of late, has failed to detect the presence of the fungus in all or in a large proportion of the cases examined microscopically, doubts have arisen as to its parasitic nature, and the recent German writers deny it altogether. They base their opinions upon their failure to find in cases recently examined any such plant as Gruby described, or as Bazin and other dermatologists have figured; but inasmuch as their testimony is wholly of a negative character, how is it that they offer it as an offset to the positive observations of other and equally competent investigators? They attempt to sustain the validity of their position by denying the competency of those who hold the opposite opinion. They say that in the case where the supposed fungus has been seen, either fat globules have been mistaken for spores, or, if the appearances seen were really due to the presence of parasitic elements, the case must have been one of ringworm. In other words, that the authorities in question were not sufficiently good microscopists to distinguish the cells of a fungus from sebaceous matter, or sufficiently careful clinical observers to know tinea tonsurans from alopecia areata. Now when this style of argument is applied to such men as Bazin and Fox on the one hand, who have seen and figured the plant, and to Hardy, McCall Anderson and many others, who believe in its parasitic and contagious nature, its absurdity becomes apparent.*

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* Is it to be supposed that one who gives such precautions as the following would himself fall into the errors he is warning against? "The greatest care must be taken on every occasion to distinguish between fatty cells and spores. * * * * If we suspect the presence of much fat, it is advisable to allow the hair or other object *to soak for some time* in ether if any doubt exists as to the nature of any particles, cells or granules. The fat cells always exhibit a wide variation as regards size, and have a duller aspect; the cells of the fungus, on the other hand, are uniform in size in any particular case, refract the light very perfectly, and their outline is more defined and contoured; they are not affected by ether. In old standing cases of tinea, the epithelial cells take on a kind of fatty degeneration, and look very like cells invaded by sporules. When the *mycelium* is well developed no mistake can well arise, but there are one or two foreign matters and modifications of normal structure that offer appearances similar in aspect to some of the less flourishing examples of mycelial threads. I have known the fibres from handkerchiefs or

If we pull out the hairs bordering upon the bald patch in the early stages, we shall find scarcely any root present, the ends tapering to a slender point from atrophy. The spores or conidia, which occur both in the substance of the hairs and on their exterior, vary considerably in size, and the scanty myceloid growth which accompanies them is very small. According to Fox the hairs contain also a large quantity of the minute stromal form of the plant which generally escapes detection, and from which the distinct sporular form may be artificially developed.

To the list of those who have been fortunate enough to see the fungus in cases of Alopecia areata, I may add myself. In two young gentlemen, aged seventeen and twenty-four, companions, and presenting all the striking and unmistakable characteristics of the disease, all the parasitic elements were found to be abundantly present. The relationship existing between them, points to the support afforded to the questioned parasitic nature of the affection by its clinical history in general, as above stated. It is as fair to suppose the one case to have been taken from the other, as if they had both been cases of ordinary ringworm. The evidence in favor of its contagiousness as furnished by many dermatologists, is conclusive, although it is by no means eminently so. Compared with the other parasitic affections in this respect, it should be ranked as follows in a descending scale: Tinea tonsurans, T. favosa, T. versicolor, T. decalvans.

If then we accept as established the parasitic nature of the disease, how shall we on the other hand account for the opposite view held by German and other authorities, who fail to discover grounds for such belief, and at the same time not be open to the charge of tacitly accusing them also of incompe-

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towels which have been used to cleanse the object-glass to be recognized as mycelial filaments. Sometimes some of the fibres of the hair will be stripped off the shaft and curl back like mycelium. The safeguard is to get the mycelium free from surroundings, and then no error can arise. The imbrication of the epithelium is sometimes irregular, and the edges of the scales present exactly the appearance of mycelium running transversely through and across the shaft of the hair, and it is really difficult to imagine that filaments are not present, more especially if there happen to be a few sporules scattered throughout the interior of the hair." This extract is from Dr. Tilbury Fox's recent work on Skin Diseases, and it is given here at length to show the errors to be avoided in the study of the parasitic affections, and that he at least may not be considered capable of the mistakes in question.

tency? Were there no other solution of such entire discrepancy in the views of equally competent observers, than which were most likely to be right or least likely to be wrong, it would still be easy to decide upon which side of the question to range ourselves, for in such cases the negative evidence of twenty good observers cannot be set against the weight of one good positive observation. But it is not necessary to resort to such an invidious method of solution. The evidence of both parties may be received with credence, and is consistent, when properly interpreted. There is a parasitic and a non-parasitic form of alopecia areata, just as there is a parasitic and a non-parasitic sycosis. In other words, the hair may fall in circumscribed patches from the growth of a parasite in its tissues, and it may fall apparently in the same way from atrophy of the bulb due to other causes There may be hereafter material difference observed in the clinical history of the two forms, possibly in their gross appearances also, so that they may be distinguished the one from the other, without the aid of the microscope; but at present this is impossible. When we recall the history of sycosis and of eczema marginatum, we need not fear that authority, however eminent, can prevent the elucidation of truth by any amount of dogmatic assertion. Such matters are to be settled by the quiet researches of a Köbner, not by international controversies. Positive and reliable evidence has demonstrated the existence of a parasitic alopecia. Negative evidence on the other hand has as fully shown that a large proportion of the cases so called are not of the parasitic form. It may be that the former is much more common in England and France than in Germany, just as parasitic sycosis is more prevalent in the former countries, and this may help explain the discrepancy in the views of the authorities in different parts of Europe. Amongst ourselves, the parasitic form is, according to my own observations, rare, whereas cases of the disease collectively, are not very uncommon. That there are very marked differences in the course and appearances of the various cases that occur here, there can be no question; their ætiological significance remains to be determined by future observation.

MYRINGOMYCOSIS.

This is a term applied to an affection of the ear, caused by the growth within the outer cavity of one or more species of a fungus. The symptoms, according to Wreden, from whose work on the subject the following account is mostly taken, are a more or less complete deafness, generally sudden in its onset, accompanied by ringing sounds and pulsation, with sensations of pain and pressure varying in intensity, in the ear affected. On washing out the organ with a jet of water, in such cases there comes away a flocculent sort of membrane or mass, varying in color from white to dark brown, the microscopic appearances of which will be described below. With its removal disappear the pain, and temporarily the other symptoms more or less, to return as the fungus grows again. The tympanum will be found of a dark red color, swollen and deprived of its epithelium, and this hyperæmia and swelling of the parts, together with the mechanical pressure exerted by the vegetable growth upon the tympanum, will account for the symptoms. Examined in the early stages the tympanum and parts adjoining are found to be covered with a fine, white, powdery substance (the leptothrix and mycelium stage), which cannot be washed away, and which soon develops into the thick and velvety mass of the perfect plant. The course of the disease may be acute or chronic. It may attain its fullest development in a few days, but left to itself or improperly treated, it may last months. After the removal of the mass by mechanical means, it may be completely renewed in a week.

Examined by the microscope this mass, large enough perhaps to cover the nail of the little finger, will be found to present some elements with which we are already familiar, but others also which we have not yet met with in the examination of the parasitic fungi thus far considered. The mycelium, which is much larger than in the fungi found in the other parasitic affections of the skin, is colorless, divided by cross partitions into joints, and at its ends filled with granular matter. Branching off at right angles from these filaments or rootlets, are the hyphens or stems, which bear at their summits the receptacles or fruit-heads. They are also transparent and colorless, more or less bulging, jointed and branched, and of considerably greater diameter than the mycelium from which they spring. At their upper and free extremities they dilate into oval or spherical heads, sporangia, from the top of which at first a few elongated, hairlike cells shoot out, which increase in number and length rapidly, and cover the whole surface in the form of a head, like the pappus or down of the dandelion when expanded. Finally, minute round cells are seen to be developed upon the ends of these slender filaments, or basides, which are pushed perpendicularly outwards in turn by the formation or budding of new spores beneath them, one after the other, until each little stem bears a chain of perhaps twenty spores united in this way, and the whole forms a head of spore-chains or conidia, composed of countless spores. The diameter of the largest receptacles varies from 0.024 to 0.03 Mm., and of the spores from 0.002 to 0.003 Mm. The spores are round, and finally, when fully mature, fall off, either singly or in chains of various lengths, and form dense groups, more or less mixed with mycelium and the hyphens, and undergo farther development. In color they are yellowish brown or black, and this difference in shade, with a corresponding difference in the shape of the sporangia, has given rise to the opinion that the fungus, which the above characteristics show to be an aspergillus, presents two species, A. flavescens and A. nigricans, in the cases observed. Wreden, however, has shown by cultivation that both forms, although preserving their distinctly individual peculiarities when growing in the ear, are only varieties of the common aspergillus glaucus, the spores of which may be found almost omnipresent, and that such variation in growth is due solely to the differences in the soil upon which they grow.

That the fungus found in myringomycosis is the cause of the disease, that is, that it is not merely an accidental occurrence in certain morbid conditions of the ear, there can be no doubt, but whether the spores can take root within an ear quite healthy at the time, is a matter of uncertainty. Wreden is inclined to the hypothesis that some diseased state of the epithelium of the tympanum is requisite for their permanent attachment and development. That aspergillus is one of our most common moulds, so that its spores are ever ready to enter the ears, and on the other hand that the disease they produce there is comparatively rare, would seem to favor this view. With regard to the relations of aspergillus to penicillium, and the occurrence of other fungi in the ear, it may be said in this connection that Wreden has never detected the latter in the ear, nor has he been able to produce it from the former by cultivation, although Karsten and others believe in their botanical identity. Other forms of fungus growth have been occasionally found associated with aspergillus in the ear, but their presence is generally looked upon as an accidental occurrence.

3. *Pseudo-Parasites.*

As already stated various affections of the skin and its appendages have at times been considered to be of a parasitic nature, which closer observation has shown to be erroneous, while in certain of them fungi have been from time to time discovered, their presence at such times being only accidental. Among the instances of parasitic growth more intimately connected with our subject than such, is the so-called *Chignon-fungus*. Some degree of alarm was not long ago created among ladies by stories of the occurrence of various sorts of parasitic growths upon the false hair so generally worn by them, and the writer has seen not a few cases of disease of the scalp supposed by the patients to have been "caught" from some impurity attached to the chignon worn. Such fears are groundless. There have been often observed little globular masses upon the shafts of the hairs before cleansing, and, in cases where such cleansing is not properly done, also upon the hairs after being manufactured into shapes for wear. These masses are composed of the elements of a fungus, which has received the name *Pleurococcus Beigeli;* Dr. Beigel being among the first to investigate their nature. Hallier considers it a sclerotium, another stage of penicillium, but this opinion, like many of those advanced by him, needs confirmation. There is no reason to suppose it capable of attaching itself to living tissue or of creating any disease of the parts with which it might be brought in contact.

The possibility of receiving animal parasites through the false hair worn, is a question of course foreign to our subject; but it may be added in this connection that the dried sebaceous concretions, which form at times upon the shafts of the hair, and are popularly called hair-eaters, and supposed to be a cause of loss of hair, are not to be confounded with anything of a parasitic nature.

4. *Parasitic Plants upon Animals.*

Favus.

But it is not upon man alone that the forms we have been considering grow; they are found likewise upon domestic animals, and may be communicated from the latter to persons brought in contact with them. I have before me, while I write, the body of a young mouse, one of a family of several caught in a seed store in this city, all of which presented similar appearances. Its head resembles a kernel of popped corn more than anything else, its form and features being concealed by an exuberant growth of dry, yellow matter. Examined by the microscope this is seen to be composed of fungus elements identical with those of the achorion schoenleinii found in favus of the human subject. Upon the mouse, too, well marked and characteristic favus-shaped crusts are to be detected. Such cases are occasionally met with. Cats catching mice marked in this way have exhibited well-formed favus crusts upon their paws, and have communicated the disease to their kittens. Dogs, too, that have caught mice similarly affected have had favus crusts developed upon their fore-paws. In the same way the disease may extend from any of these domestic animals to man, cases of which are cited in abundance. Both mice and cats have repeatedly communicated favus to children playing with them, and St. Cyr in some recent experiments received it himself from a dog, to which animal he had transferred it from a cat. Artificially it has been again and again cultivated upon rabbits with material from the human subject, and even upon the heads of hens it has been observed in two instances. Upon all these animals, either about the hairs or feathers, the unmistakable form of the favus crust was developed, preceded in the carefully watched cases of artificial inoculation by the herpetic or ringworm-like earlier manifestations, precisely as on the skin of man. The presence of favus, therefore, upon such animals may be easily recognized, and by proper precautions its farther transmission may be prevented. As it occurs upon mice more commonly than upon other animals, and upon such others mainly as come in contact with them, it is possible that they are to be regarded as the original or favorite host of this parasite, through which it has been introduced upon man.

Tinea tonsurans.

Ringworm, too, has been observed upon some of the domestic animals, presenting the same characteristic appearances, the circular patches with elevated and advancing borders, the scaly central portion, and the stumps of hair projecting from the parts long affected, as upon the skin of man ; and in the epidermal scales and the hairs removed from them precisely the same parasitic elements are detected by the microscope as in the various forms of ringworm upon man. The animals most commonly affected in this way are the cow and the horse, and Gerlach has succeeded in transplanting it from oxen to calves and horses, and from these to his own arm and to the skin of his pupils. In these, and in similar cases of inoculation conducted by other observers, the transfer of parasitic matter from the animal to man has in every instance given rise to true ringworm. Upon the sheep and the pig the plant has not yet been made to grow. But artificial inoculation is by no means essential to the communication of the disease from the animal to the human subject. Numerous cases are on record of cow-keepers and milkmaids taking it from their four-footed charge, of children from calves, and of grooms and cavalry soldiers from their horses. I have myself seen three children with well-marked ringworm of the hands and face taken from the family cat, which was similarly affected. Upon these animals it constitutes one of several affections called mange.

Tinea versicolor.

With regard to this affection no instance of its natural occurrence upon animals, so far as I am aware, has been observed, although Köbner has succeeded in producing upon the rabbit by inoculation a well defined scaliness of the skin lasting from five to seven weeks, in which abundant conidia and slender fungoid threads were found.

5. *On the supposed identity of the Vegetable Parasites, and their relations to the Common Moulds.*

To those not familiar with the recent literature of this branch of dermatology it may seem surprising that very contradictory opinions prevail among authorities upon the subject with regard to the mutual relations of the vegetable parasites we have been considering. As we have described the various affections to which they give rise, it will have been observed that they differ from each other in external appearance manifestly, and that the fungus elements belonging to each have their individuality marked with equal distinctness when examined by the microscope. How then could the question of the possible identity of all these forms have arisen, and have become one of the most interesting subjects for the investigation of dermatologists and mycologists of the present day? How can it be that such men as Hebra and Pick, Fox and Hutchinson, as examples, upon the one side, should believe that Favus, Ringworm, and Pityriasis versicolor are all forms of disease caused by one and the same fungus, exhibiting its variations in growth and external manifestations according to its stage of development, soil, etc., while on the other hand Bärensprung and Köbner, Anderson and all the French authorities, observers equally well known and trusted, should maintain as positive a belief in their non-identity? The same difference of opinion exists among the mycologists who have investigated the subject from their special point of view. It is evident, therefore, that no absolutely positive answer can be given to this important question in our present state of knowledge. The data upon which any probable conclusion in the matter can be based must be the result of three methods of investigation: first, clinical observation; second, artificial inoculation; third, study of the full development of the fungi in question by cultivation.

First. It was clinical observation which first led Hebra to believe in the identity of the parasites found in favus and ringworm. He noticed the occasional development of favus crusts in cases of ringworm, and the production of both, alone or in combination, upon parts to which poultices were applied. He concludes, therefore, that Tinea tonsurans is an earlier stage of Tinea favosa, while Tinea versicolor is a still younger phase of development of the same plant.

With regard to the latter affection, it may as well be removed from our consideration of the question at once. No good clinical ground (the opinions of Hebra and Hutchinson to the contrary, notwithstanding), and certainly no sufficient experimental data, have ever been presented to show its connection with either favus or ringworm. Clinically, Tinea versicolor must be considered a distinct affection, as heretofore by most dermatologists. Its mycological relations are yet to be discovered.

The question turns, therefore, mainly upon the relationship of the two other affections. Fox believes that favus can be directly produced from bad cases of ringworm by keeping up a proper amount of irritation. There can be no doubt of the occurrence at times of favus in cases of ringworm, also none of the occasional development of both affections (in Germany, at least,) upon portions of the skin covered with damp cloths or poultices. Such occurrences are rare, however, and by themselves are of little weight in the question of identity, when we consider that in one hundred cases of chronic ringworm favus may not be developed a single time, and that favus may, and generally does, exist for years without any association with any of the varieties of true ringworm. The exceptional cases of the development of favus upon the latter may well be wholly coincidences, and should be fairly so considered when balanced against the clinical proofs of the non-identity of the two. In connection with the other class of cases, in which herpes tonsurans is said to be more or less frequently observed accompanying favus, it must be remembered, as already stated, that the early stage of the latter very closely resembles ringworm, and has been called by Köbner, who has made the subject a special matter of investigation, the early herpetic stage (das herpetisches Vorsta dium). That such appearances are often mistaken for ringworm, and have largely contributed to the belief in the frequent association or identity of the two affections, there can be little doubt. Peyritsch, in the most recent investigations upon the inoculation of favus, and St. Cyr, in his late experiments upon the transmissibility of the affection to animals, and from them to man, both speak of the occurrence of this ringworm-like stage of favus, and of its liability to be confounded with Tinea tonsurans. The latter says that both Rollet and Tripier recognized, in the appearances upon his own arm, produced by inoculation from his dogs affected with favus, appearances which offered "*tous les caractères d'un bel' herpès circiné,*" "*non un herpès circiné legitime, mais bien une forme de la teigne faveuse véritable.*"

Peyritsch concludes, as the result of his experiments, that "herpetic eruptions often occur as a vorstadium after inoculation with favus, but also not infrequently after the development of the cup-shaped crusts, and often not at all; that these appearances are the result of irritation, and are not identical with Herpes tonsurans circinatus." Köbner recognizes and describes in the external appearances characteristic differences by which the true ringworm and the herpetic stage of favus may be distinguished from each other, which need not be given here in detail, but another means of differential diagnosis is afforded by the microscope, by which the fungus elements present in the latter are shown to be those belonging to favus, the achorion and not trycophyton. Now, without attaching much significance to minute differences in the microscopic appearances of parasitic fungi, so far as this bears upon their botanical identity, for clinical purposes they are of some degree of importance, and when these differences are constant and consistent only with the theory of the non-identity of these affections, their significance must not be disregarded. When, therefore, a case occurs in which favus and herpes tonsurans appear to be combined, and in which fungus elements apparently identical with those of the latter are found in the outlying circles, as in the case reported by Kohn in the 3d Heft of the Archiv für Dermatologie of the present year, we cannot regard it in any other light than exceptional, and as an instance of the chance, coincident occurrence of the two distinct diseases.

The clinical proofs of their non-identity, as shown by the history of thousands of cases of pure tinea tonsurans without any development of favus in connection with them; in the highly exceptional simultaneous or subsequent appearance of true ringworm in cases of favus; the frequency of the former, the rarity of the latter, in communities, and the varying relations of their comparative frequency both in different countries and in cities and rural districts; the prevalence of ringworm of the scalp for years continuously in orphan asylums without the production or transmission of any other parasitic affection than itself among the inmates; the ease with which the one, the difficulty with which the other, is communicated; the spontaneous transmissibility of both forms from man to the domestic animals and back again through several hosts to the human subject, their individual identity being without exception preserved the meanwhile,—these and other facts, which might be mentioned, would seem to be conclusive.

Second. The results of inoculation, as practised especially to determine this question, point almost without exception to the same conclusion. Favus, when transplanted from man to man, from man to domestic animals, or from animal to animal, produces always favus and nothing but favus, according to the experiments of Köbner, St. Cyr, and Peyritsch, above referred to, and the same unvarying preservation of individuality has been observed with tinea tonsurans. On the other hand, Pick believes that he has obtained indifferently both affections by inoculation of the parasitic elements of either one. His results, therefore, are directly at variance with those of former observers, and as they are of a positive character, while those of the others are merely negative, they might seem entitled to the greater weight in the question. When we consider, however, that all the other observers have obtained results seemingly pointing to the same conclusions, but which have been otherwise interpreted by them, we think that, in connection with the recognized fact of the herpetic stage of favus, Pick's views may be fairly set aside until they are confirmed by other investigations and by general clinical observation.

Third. Another method of studying the question, and one which would seem to promise an easy and positive settlement, is that by cultivation. That none of the parasitic fungi we have been considering attain their normal and perfect forms under the conditions of their growth upon the skin, and that therefore their true botanical position is to be learned by observation of them under circumstances better fitted for their complete development, is universally recognized. In accomplishing this, however, it is evident that we should also settle definitely this question of their mutual relations, for if the fungus of Tinea tonsurans and of T. favosa are in reality identical and so seemingly unlike in their microscopic appearances, external manifestations, and clinical history from differences in soil, in stage, or from any other of the various causes assigned to account for their apparent non-identity, it is evident that if removed from the skin to conditions favorable to their normal growth, we should have a return to their one common parent form, and thus have before us the long-sought solution of this mysterious question. This method of study has therefore been eagerly adopted within the last few years, but the results obtained unfortunately are far more contradictory, and unsatisfactory even, than those derived from clinical observation and from inoculation. The difficulty has not been in making the fungi taken from these cutaneous diseases to grow apparently when transferred to other soils, but to convert them always into the same fungi, when they have attained their perfect development. Not only do different observers obtain different results, but various results at different times. Thus by transplanting favus elements to various substances, such as glycerin, albumen, milk-sugar, starch, paste, the surface of fresh fruits, etc., or to solutions of certain salts, matters upon which fungi are known to thrive, all sorts of moulds are obtained after a while, among which of most frequent occurrence are penicillium glaucum, mucor mucedo, aspergillus glaucus and torula.

Hoffman obtained in this way penicillium and mucor, but looks upon the former as an accidental occurrence, and upon the latter as the real cause of favus, while other mycologists regard both as botanically identical. Hallier states that he has seen the parasite in favus develop into penicillium; Baumgarten also obtained penicillium from its cultivation; and Lowe, aspergillus. Pick, too, has obtained from tinea favosa, penicillium. With regard to the fungus of herpes tonsurans in particular, Hallier at first looked upon the tricophyton as penicillium, but later makes it out to be aspergillus. Pick cultivates it into penicillium, while Neumann sees it developed into penicillium and trichothecium. The fungus of pityriasis versicolor, too, Hallier finds no difficulty in tracing back to its parent stock, making it out to be stemphylium, the achorion form of aspergillus. With regard to the ear fungus, both forms, the aspergillus flavescens and A. nigricans, have been seen by Wreden to return under cultivation to aspergillus glaucus, while Karsten, from his experiments, is inclined to the opinion that penicillium is the original source from which they spring.

On the other hand, Köbner, Peyritsch, Karsten and de Barry, in their recent investigations in the same field, while finding no difficulty in obtaining penicillium and the like in their cultivations of favus matter, regard its presence in their experiments as merely accidental. The elements of penicillium, aspergillus, etc., are omnipresent, awaiting only the proper conditions of soil, temperature and moisture for development, so that unless their germs are primarily excluded by the most rigorous measures from the materials and atmosphere used in these experiments, their constant appearance under circumstances best adapted to their growth, is not surprising, though their absence would be. Now such exclusion has been found to be almost an impossibility in all the methods of experimental cultivation hitherto employed by different observers, but the greater the precautions used to keep them out, the less frequent their occurrence. Thus Peyritsch in his experiments with the favus plant, generally got penicillium or mucor, but when he used extraordinary care no farther fungus development was observed.

This, with the results of his other experiments, which have been, and remain to be mentioned, leads him to the conclusion that "the specific individuality of achorion schoenleinii must, in our present state of knowledge, be preserved." De Barry also concludes from his investigations that the plant in favus, as well as the other cutaneous fungi, are specific parasites. Köbner failed to produce any mature form from the favus plant. Karsten in his recent work (Chemismus der Pflanzenzelle), states his belief that the achorion from its resemblance to the milk fungus may be derived from some common fungus, but has been unable to obtain any advanced growth by which its connection with such could be established. Neumann, too, in his latest published observations (Zur Entwicklungsgeschichte des Achorion), withdraws his former statement, that he had traced the parentage of favus to penicillium, and as the result of more careful methods of cultivation, says that he has been unable to obtain the perfect development of the achorion, and that the data for determining its connection with any known fungus are still wanting.

Still another method of gaining light upon this supposed connection between some of these common moulds and the vegetable parasitic growths of the skin has been tried. It is evident that if favus, and ringworm, and pityriasis versicolor were really caused by the attachment to, and subsequent growth upon, the skin of some of the elements of penicillium, aspergillus and the like, to which the fungi found in these affections are referred by some of the observers above mentioned, it might be possible to produce these diseases *de novo*, by transplanting such common moulds to the human skin, and thus settle the matter. Attempts of this kind have frequently been made, and the results are as apparently conflicting as the evidence derived from the methods already considered. While Hallier asserts that he has produced true favus by transplanting penicillium to the skin, and Pick thinks that he has seen it give rise to the herpetic stage of favus, Peyritsch, and Köbner, and many other investigators have repeatedly tried to produce some parasitic affection by transplanting this and many of the most common moulds to the skin, but always without success; although they have found no difficulty in producing the diseases we have been considering by the same methods of transferring parasitic matter directly from them to other subjects, as already described.

If we accept as reliable the statements of those of the above observers who claim to have been thus exceptionally successful in these experiments, it must be only after due consideration of the possible fallacies attending them. The necessary application, for considerable periods, of bandages to protect the parts experimented upon, for instance, is one of the conditions most apt of itself to favor the accidental development of the diseases in question. The irritation of the skin, provoked by the dressings or lesions made, or by the foreign matter placed in contact with it, might readily be mistaken for the early stages of ringworm or favus. There should be no mistake, however, in the results obtained. Let there be one trustworthy production of well-marked favus by the transference, with necessary precautions, of any of the common moulds to the skin, and we should then have a piece of evidence about the character of which there could be no question, which could be preserved indefinitely for inspection, and which would go far to settle the matter in dispute. As it stands, however, this method of investigation, taking the negative and the so-claimed positive results together at their worth, has furnished no unquestionable proof of a direct connection between the well-known moulds and any of the parasitic affections. Indeed, every day chance is offering to the success of such experiment the most favorable opportunity in the omnipresence of seed and abundance of cutaneous soil, harrowed and fertilized by nail and dirt, if these conditions be thought essential to the development of the former. In addition, every possible variation in the chemical and physical nature of the skin is offered in its multifarious changes in disease. That these diseases are not of this every-day production, is sufficient to show that the right seed is not at hand for development. That no peculiarity in the nature of the soil is requisite, the ease with which ringworm is transferred from one skin to another, even in the healthiest state, is a sufficient demonstration.

With regard to the identity, then, of the fungi found in these affections, we must still maintain their specific individuality, because clinically they are distinct, notwithstanding the deceptive inferences drawn from accidental coincidences, and because neither the results of transplanting nor of artificial cultivation have been such as to counterbalance even the negative evidence drawn from the same sources. With regard to their identity with any of the common moulds, the evidence presented is still more questionable.

Too much can scarcely be said in condemnation of the way in which experiments have been conducted by certain so-called observers to determine the supposed relations of moulds, not only to these affections, but to all sorts of internal and constitutional diseases. One might suppose, from the conclusions drawn by them from such investigations, that the cause of all diseases had been already determined. The most charitable opinion to express concerning much of what has been done or written in this country and in Europe, at least of such part of it as has claimed most positive results and the easy solution of some of the most mysterious questions concerning the causation of disease, is to call it boy's play. Unscientific work and hasty conclusions of this sort serve only to throw discredit upon one of the most important fields of research open to the pathologist, and to turn aside the true student from labor in it. The whole study of mycology is as yet in its infancy, and a master-mind is needed to clear away the mist and error thrown around it by such dabblers. In its present state it is to be feared that it can do little to settle even the questions we have been considering, with reference to the affections universally acknowledged to be of a parasitic origin.*

6. *Precautions against Vegetable Parasites.*

Regarding, then, the vegetable parasites of the skin as specifically distinct and without established relations to any of the well-known and common moulds, (as a due regard to their clinical characteristics compels us in the present chaotic state of mycological knowledge respecting the mutual relations of the latter), what positive knowledge have we of their distribution and occurrence, by which the danger of acquiring the diseases they occasion may be prevented? That the minute elements of fungi may be conveyed by the atmosphere, their universal presence, as shown by the microscope upon a glass slide left for any time "undusted," and their unfailing development when suitable soil is provided, are sufficient proof. In the experiments conducted so extensively of late in connection with the question of spontaneous generation, and in those of artificial cultivation above alluded to, it has been found almost impossible to exclude such germs from the substances employed in them; and in this lies the fallacy of most of the conclusions drawn from such investigations Pasteur found that the air admitted to substances previously freed from such germs gave rise to new growths of the same in accordance with the nature of the surroundings. Thus, of the flasks deprived of air and opened at the foot of the Jura, at a remote distance from human habitations, 12 out of 20 remained free from organisms subsequently; at a height of 850 metres, 15 out of 20 remained free; and at a height of 2,000 metres only 1 of 20 showed signs of their growth; while of 13 opened at the inn only 3 failed to exhibit their development. These and similar experiments, repeated under varying conditions of locality, although they shed no light upon the occurrence or distribution of the particular fungi we have been considering, so far as we know, do illustrate the universality of similar elements near the habitations of men, and the ease with which they must be conveyed from place to place. Knowing nothing, therefore, of the parasitic fungi beyond that phase of their existence upon the skin of man and the domestic animals we have been considering, we must fall back upon the clinical history of each of these affections for our knowledge of the proper safeguard against them.

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* Those who are especially interested in the question of the relations of low organisms to disease, will find in the articles below mentioned criticisms upon the imperfect methods of investigation employed, and upon the hasty conclusions drawn therefrom, by some of the recent observers and writers in this field of inquiry.

1. Ueber die pathogenetische Bedeutung der kleinsten Organismen bei Infections-krankheiten. Von Dr. August E. Vogl.—*Archiv für Dermatol. und Syph.*, 1870, *p.* 393.

2. Les Vegetaux parasites et les nouvelles Recherches sur les Maladies virulentes et contagieuses. Par Lortet.—*Annales de Dermatol. et de Syph. Duxième Année, p.* 29.

3. A Review of Dr. Salesbury's Microscopic Examinations of Blood; and Vegetations found in Variola, Vaccina, and Typhoid Fever.—*Boston Medical and Surgical Journal*, 1868, *Oct.* 1.

4. Der gegenwärtige Standpunkt der Mycologie mit Rücksicht auf die Lehre von den Infections-krankheiten. Von Dr. Eduard Eidam. Berlin, 1871.

Tinea favosa.

We have already seen that this disease is observed much more frequently in the country than in the city, and among poor children than upon those who are kept clean. How infrequent its occurrence is in comparison with other cutaneous diseases may be judged by the following data. In three successive years out of some 10,000 affections of the skin in the Vienna clinic, only thirty-six cases were noticed. These were of course representatives of disease among the poorer classes. How much less frequently it occurs among the higher classes and a cleaner race, may be seen by examining Mr. Wilson's "statistics of cutaneous disease among the wealthier classes" in England. In 10,000 consecutive cases it occurred but three times. My own experience in this vicinity shows similar results. In 1,000 consecutive tabulated cases of skin disease among private patients, but a single case was seen; whereas in the same number of cases among out-patients of the skin department of the Massachusetts General Hospital, representing a poorer class of persons, there were four cases of the disease. My own observation teaches me that favus affects perfectly healthy skins belonging to perfectly healthy bodies; that no predisposition or cutaneous idiosyncrasy is essential to its development; that a dirty or a wounded epidermis is favorable to the attachment of the achorion, but not absolutely requisite; that although by no means so contagious as some of the other parasitic affections, yet almost every case is connected with others in the same family or among the playmates of the patient first affected, in the course of its long history; that nearly every case may be traced back to its source of infection; that direct contact therefore with parties affected, either human or animal, is generally the cause of the spread of favus; and that without such communication there is little danger of acquiring it.

The following cases will illustrate the contagious nature of the disease, and the long time which sometimes elapses between inoculation and the development of the characteristic appearances. A few years ago I saw a poor girl, fifteen years old, of a consumptive family, who had had the disease seven years. She had always kept her head well wrapped up, and washed the bandages herself. She subsequently died of consumption, without having pursued any proper course of treatment for the favus. Three years before I first saw her, her little cousin, eight years old, had put on her bonnet, while the disease was in a very active condition. About a month afterwards a little pimple was observed on the crown of her head, which disappeared for a week or two at a time after washing it, but always returned. It appeared white and scaly. One year after the death of her cousin, the child was brought to me with a well-marked and large mass of favus situated upon this spot. * * * Some time since I was called to see two strong and healthy children at the western end of the city, upon whose heads were well developed masses of favus. There were two other children in the family, and on examination the disease was found also upon one of these. It had appeared successively in all these cases. On going into the street I discovered a boy, a playmate of these children, with his head almost completely deprived of hair by a favus of long standing. From him the former had taken it.

Tinea tonsurans.

This, as already stated, is a much more contagious and therefore a much more common affection than favus, and is relatively of more frequent occurrence in cities than in the country. The greater ease with which it may be transferred from one host to another is best seen in large asylums. A case of favus may be admitted, and months may pass without transference to another child with ordinary care, and when entirely uncared for but few other cases will appear; whereas, if a single child with ringworm be admitted, the disease will spread rapidly among the inmates, even before the original case may be detected. The same eminent contagiousness marks the spread of the affection in the community at large, and no age, no condition, no amount of cleanliness will prevent infection. In Mr. Wilson's statistics of 10,000 cases of cutaneous disease among the wealthy, 252 cases are noted, although in this number are not included cases of sycosis and eczema marginatum, which are varieties of the disease. Among the 1,000 cases of the same class in my own practice above quoted, eighty-one instances of all kinds are recorded, whereas in the other thousand from the out-patients of the Massachusetts General Hospital, only thirty-seven cases of all varieties occurred. It will be seen by these figures, first, how much more widely prevalent is herpes tonsurans than favus amongst all classes; and second, how much more frequent in comparison with the latter is its occurrence among the wealthy and cleanly than among the poorer classes.

I have several times been able to trace the transmission of the affection through the different members of several families in succession, all of whom were accustomed to the daily use of the bath, and the descendants of what was possibly a single spore at the time of its transference to the first case, may thus be kept in view for months and years, oftentimes upon successive hosts. The boy may bring home from school a ringworm of the face or hands, which may give rise to other ringworms upon any one or many members of the family, young and old, and from these may arise upon the former herpes tonsurans of the scalp, upon the latter sycosis or eczema marginatum. One of the most common starting-points of such occurrences in our community, however, is the *barber's shop.* A large proportion of the cases above enumerated, and many more might be added, since recorded, were of such origin. The patients were young gentlemen, and the barber's shops frequented by them were the best in Boston. From this it follows that the habits of the former in point of cleanliness were unquestionable, and the customs of the "establishments" such as are least likely to foster and communicate contagion. The danger of catching barber's itch, so called, or other horror usually associated with public shaving, is so universally and strongly prevalent among gentlemen, that extra precautions against such infection are generally taken by them. Such was the case in most of the instances here referred to. The patients had nearly all had their own mug, soap, brushes and razors, yet with all these trusted safeguards, they had acquired the disease. It follows, therefore, that with all possible precautions on their part, gentlemen who are shaved in public places may there get simple ringworm or its later stage, sycosis.

How this may happen is very easily explained. To these shops, (or saloons as they claim to be called,) in addition to the regular customers who are not shaved elsewhere, there resort an irregular set of residents, who are shaved sometimes in one place, sometimes in another, and also a large and ever changing multitude of travellers. It is evident that opportunity for the entrance to a shop of cases of so common an affection as ringworm, or of one so chronic as sycosis, in all this shifting multitude, will not be wanting. Were there any doubt upon this point it would vanish with the statement of the fact that many of the patients here spoken of had continued to be shaved at the place where they took the disease after it was fully developed. The question is, how it may be communicated from one customer to another, both of whom have their own equipments, which we will accept as reserved for their individual use? The operator uses not only the brush, but his hands also, in lathering a face thus affected. These are not always washed before they are applied to the face or apparatus of another; the razor is first stropped, without thorough cleansing perhaps, upon the common strop, even while the act of shaving is only half finished, it may be; the towel used in wiping the face of the first goes not upon a few afterwards; the comb, used upon parts of the face not shaven but yet similarly affected, goes directly to the beard of the next comer. These are the channels of communication by which these parasitic cells, so small as to be invisible, and incapable of destruction by the soap, water or washes used during the process of shaving, may gain passage from one face to another, even when all possible precautions are observed by the regular patrons; when the common property and apparatus of the shop are employed, the danger of conveyance is of course largely increased. There are, however, other ways in which the disease may be transferred. The danger of infection is not only for the person shaved; the operator himself may take the disease. I have treated in several instances ringworm upon the hands and fingers of barbers. To how many of their customers may they in turn not have given it?

It will be seen, therefore, how important a part the barber's shop may play in the maintenance and transmission of Tinea tonsurans. From it as a starting-point the disease is carried home and given to other members of the family, or even, and not unfrequently, taken by young gentlemen into other families. There can be no doubt, too, that herpes tonsurans of the scalp may be conveyed from one boy's head to another in a similar way by the hair-cutter; but this is a danger far less to be feared than that of the barber's shop, for the affection of the scalp among cleanly children is comparatively rare, while that of the face in gentlemen who resort to the latter place, on the contrary, is by no means rare.

The following, among many instances which might be cited, will illustrate the contagious and persistent character of some of the forms of Tinea tonsurans:—

In an asylum for orphans in this city, containing about two hundred inmates, ringworm of the scalp had been long prevalent, and the affected children had been allowed to mingle at will with the others. The thirty thus affected were subsequently kept in a separate portion of the building, entirely shut off from all communication with the other inmates, and subjected to treatment. The spread of the affection ceased, and no new cases occurred, except among the newly-received children who brought it with them, and who were at once placed in quarantine. It was hardly possible that so many heads could be properly attended to, and consequently the cure was prolonged in some instances for more than a year, and in a few the affection reappeared after apparent recovery. Among the latter class was one who was put out to service before the disease was completely eradicated, and upon whose head it returned after entering her new home. In this household were three children, all below the age of ten. Several months after her arrival, I was called to examine the heads of the two oldest, and found upon them well-marked herpes tonsurans. In several weeks the youngest also showed unmistakable signs of the same affection, although its progress was at once checked. In the course of a few months a little cousin from the country came to reside in the family, and in six weeks the disease had also communicated itself to him. In two of these cases, in addition to the affection of the scalp, there were well-marked ringworms upon the face and neck. In the asylum, from which the disease was brought, it should also be stated, in two of the nurses, who had long had charge of the cases there, the nails were greatly disorganized by the growth in their substance of the fungus.

Some time ago I was consulted by a young lady, Miss X., who for fifteen months had been treated for ringworm upon the face and neck. The disease rapidly yielded to remedies where properly applied, but certain portions of the skin, difficult of access and hidden from view, were never quite thoroughly attended to, so that fresh growths of the plant were constantly springing up on the arms, neck, shoulders, and other parts, which might have been easily and permanently killed by thorough attention. * * * * A month after Miss X. was first seen by me, a lad, Master Y., five years old, who had been much with her at the sea-shore, exhibited a circular patch of herpes tonsurans upon the scalp some two inches in diameter, which soon yielded to treatment, and did not return. In the spring of the following year, the mother of Miss X. brought to me a younger daughter with a well-defined ringworm as large as a silver dollar upon the arm, which at once disappeared under treatment. * * * * Again, in October of the same year, I was called to see Miss Y., the sister of Master Y., just mentioned, and the intimate friend of Miss X., the original and constant patient, whom she had been lately visiting. In her case there were four distinct rings of the disease upon the left cheek, which were shortly destroyed by the remedies applied. * * * * Here, then, were three persons affected in succession by the same patient, all of whom might likewise have served as centres for the spread of the disease had they not received prompt treatment.

The following cases are briefly described in illustration of the dangers of public shaving, not only to the persons immediately exposed, but to those with whom they associate:—

A year ago Mr. K. acquired a ringworm of the beard at a barber's shop in a town near this city, which persisted for several months under the domestic remedies at first used. During the past summer his sister consulted me for a ringworm of the face, contracted beyond question from her brother.

Mr. G. consulted me last spring for sycosis of the beard of many months' duration, the sequel of a ringworm of the face coming on after being shaved, contrary to his usual custom, at a barber's shop. On learning the nature of the affection and its contagious character, he informed me that his wife and child were possibly affected by the same disease. I subsequently saw them, and found several well-marked ringworms on the face and arms of the former, and one large ring upon the face of her infant.

Mr. F., after being shaved in Washington, in 1870, brought home a ringworm upon his face. In spite of the use of several domestic remedies, it lingered and continued to spread. He came to see me with his wife. At that time the disease was largely scattered through his beard, as well as upon the chin. His wife had acquired it also, and presented well-developed ringworms of the face.

Mr. S. acquired a ringworm at a barber's shop two years ago in an adjoining city, in which shop four other gentlemen whom I saw, and not a few others, also, according to their statement, were similarly infected. Mr. S. had not been affected but a few weeks, during which several new rings appeared, before the young lady to whom he was engaged to be married applied to me also for relief, having a well-defined ringworm upon her check. The possibility of contact with the face of Mr. S. was not denied.

In these cases, sister, wife, child, and *fiancée* were secondarily infected by the barber's shop. They represent a multitude of similar instances within my own experience, but will serve as well as many the purpose for which they are here introduced.

Tinea tonsurans is to be guarded against, therefore, in the school, whenever a child in attendance is known to be affected by it in any form; in the barber's shop, always; at home, when brought into it by any one member of the family; and at times upon the skins of the domestic animals.

Tinea versicolor.

Pityriasis versicolor is less frequently brought to the notice of the dermatologist than herpes tonsurans, but its real prevalence cannot be estimated. In the first place, its nature keeps it from the light, and therefore out of sight; and secondly, it causes the patient comparatively little trouble, so that he seldom consults his physician until it has existed for a long time and spread over an extensive surface. It is, in fact, often first discovered by the latter when the patient's person is inspected for other purposes, as already mentioned. In Mr. Wilson's 10,000 cases it occurred 131 times; in my own observation of private patients, 13 times in 1,000. Among hospital patients, 14 times in 1,000. The ratio it bears to other cutaneous diseases seems to be remarkably constant, therefore, in the two countries and among all classes of society, although these figures cannot be relied upon as to its absolute occurrence, as in the two former parasitic affections. It is contagious, but in a low degree, and its direct transference from one individual to another is seldom observed except among those living upon the closest terms of personal intimacy; even under these conditions it often fails to be communicated. How else than in this way it originates upon a person, we have no means of knowing.

Tinea decalvans.

With regard to the prevention of the parasitic form of Alopecia areata we have hardly a word to say, except that it is evidently a very rare affection, and therefore but little danger from it is to be feared. How freely it may be communicated, our insufficient data will not allow us to determine. An instance of its spread from a single child to some thirty inmates of an English school, and the fact that my own two cases occurred upon intimate companions, suggest that it may be readily transferred from one host to another.

Myringomycosis.

As to the prevalence of this disease our knowledge is scanty and of recent date. Dr. J. O. Green, aurist of the city hospital, and Dr. C. J. Blake, of the Eye and Ear Infirmary, have kindly furnished me with the following information, by which it appears that it is by no means a common affection here.

Dr. Green writes: "In 755 consecutive cases in private practice, I have found only four cases of parasitic growth where the parasite seemed to me to cause any symptoms. These cases included two of so-called aspergillus glaucus, one of A. nigricans, and one of the simplest form, viz., round or oval single cells. In addition to these, in thirty-three microscopic examinations of various masses removed from ears, some in private practice and some at the hospital, I found in three undoubted vegetable growth, which I classified at the time as penicillium."

Dr. Blake says: "I have had, I think, but five cases of myringomycosis, and of these four occurred in private practice."

Several of the other aural surgeons of the city, of whom I made similar inquiries, state that they have seen but one or two cases each.

Our knowledge of means of preventing infection is likewise very scanty. Of Wreden's ten cases, the fungus was found in both ears in four, and one case narrated by him seems highly suggestive. The affection in this patient was obstinate, and the relapses were unusually frequent. On examining his sleeping-chamber, the window near the head of his bed was found covered with the growth of aspergillus.

There remains to be mentioned only a single rule applicable to the management of all these affections before professional advice is obtained.

All articles of clothing which have been worn in contact with parts upon which the parasite grows should be purified by immersion in boiling water, or, where the nature of the material does not permit this, by baking. All bed-linen, bandages, brushes, combs, and towels, or other articles suspected of similar contact, should be treated in the same way, and, of course, should be used by no other person until thus purified. The patient, if a child, should be kept by itself as far as possible, and those having charge of the case should thoroughly wash themselves after handling the parts affected. With such precautions there is but little danger that the disease will be transferred to others, and when proper treatment has been once put in operation such danger of infection is far less.

SMALL-POX IN MASSACHUSETTS.

By the Secretary.

SMALL-POX IN MASSACHUSETTS.

This loathsome disease has never been completely eradicated from any country of large extent in which its seed has once fallen. Every year since the system of registration was commenced in Massachusetts has had its record of deaths from this cause. In twenty-eight years small-pox has destroyed a little over three thousand lives, the numbers in each year rising sometimes as high as three hundred, and again falling as low as twelve. In view of the statement so often and so confidently made, that the protective power of vaccine has gradually diminished in its passage through the bodies of so many millions of people since its first use by Jenner, it is interesting to observe that the mortality from small-pox in Massachusetts has not progressively increased, as might have been expected if such deterioration of vaccine were taking place. Thus we find that in 1868 there were but twenty deaths from small-pox, in 1869 but fifty-nine, and in 1870 one hundred and thirty-one, thirty-six of which number were in a single town (Holyoke). The average of these three years, the last of which we have complete records, is lower than the annual average of the past quarter of a century.

The mortality from small-pox in the State for 1871 is as yet unreported by the town clerks, but it is very certain that it has been greater than usual, and that it has occurred for the most part *in a few places.*

Early in the year the subject of small-pox engaged the attention of our Board. The outbreak at Holyoke, in the autumn of 1870, was alarming. We then received accounts from the Metropolitan Board of Health of its prevalence in New York. A few cases occurred in the towns near Holyoke, in the Connecticut Valley. A family in Lowell recently arrived from Europe was attacked, and the nature of the disease was for a time concealed from the authorities, until the poison got scattered about the neighborhood as should not have occurred. The medical journals of France and England reported a sudden accession of virulence in the disease, or an increased susceptibility to its influence observed in various parts of Europe.

Under these circumstances the following circular was sent to the health authorities of every town in Massachusetts:—

[Circular.]

COMMONWEALTH OF MASSACHUSETTS,

State Board of Health, Boston, April 10, 1871.

To the Mayors of cities, and Selectmen of towns in Massachusetts.

Gentlemen:—At a meeting of State Board of Health, held April 5th, 1871, we were directed to communicate with you on the subject of *vaccination.*

There is reason to believe from information received from various parts of the State, that a very large number of people, of all ages, are at the present time unprotected against small-pox.

The laws of nature governing the spread of epidemics are not always clearly understood; but we know that small-pox may certainly be propagated among the unvaccinated by contagion or infection; and this not only by actual contact of person or clothing, but also through the air surrounding those affected with the disease.

Moreover, there is much evidence to make it probable that a marked disposition to contract the disease exists at certain times, and spreads over a great extent of territory.

Before vaccination was introduced by Dr. Jenner, this "epidemic influence" was perfectly evident, occurring at various intervals, and sometimes more than once in a generation.

This same "epidemic influence" may be also traced in the present century, and when it occurs those who are not protected by complete and efficient vaccination are exposed to great danger.

The present epidemic of small-pox in the city of New York, and the recent outbreaks at Holyoke, and several other towns of this State, should be taken by us as warnings to be prepared for this loathsome and destructive disease.

By the use of your personal influence, and the exercise of as much of the complete authority given you by chapter 26, sections 27–31, General Statutes of Massachusetts, as may seem expedient, we believe many lives may be saved and much suffering avoided in the future. And we would especially urge upon you the importance of protecting the people by careful vaccination before small-pox appears among you.

We remain, in behalf of the State Board of Health,
Very respectfully, your obedient servants,
HENRY I. BOWDITCH, *Chairman.*
GEORGE DERBY, *Secretary.*

It is hoped and believed that the preceding circular was the means of saving life. It certainly contributed to the general interest in the subject which has prevailed, and which has led to a more complete vaccination of the people. Small-pox has found a secure foothold in very few places. Among the twenty most populous cities and towns it has been epidemic in Lowell and Holyoke, and in none others. It has appeared in Worcester, and has been driven out by the vigilance of the health authorities, the deaths numbering but two in ten months. It has tried Springfield and failed. Boston has been almost entirely exempt, and the same may be said of the large cities in its immediate vicinity. In many smaller places cases have occurred, but the disease has only spread in Lowell and Holyoke, and there can be little doubt that it would have been quickly extinguished there if, *at the first outbreak*, the health authorities had acted with more promptness and decision.

"*Principiis obsta*"—stop the first beginnings—can have no more useful application than in dealing with small-pox; and that this has not always been done is partly at least the fault of the State laws relating to the subject. Lowell and Holyoke have a large foreign population of young persons, including many French Canadians. These people are notoriously perverse in refusing vaccination, and when sick with small-pox conceal if possible the nature of their disease. Neither their ignorance nor their foolhardiness should be allowed to endanger the lives of those among whom they dwell.

In a circular dated May 6th, 1871, and addressed to our medical correspondents in all parts of the State, the following question was asked: "Are the people protected from small-pox by vaccination?" The replies have come in from all quarters, and their general purport is that the people are protected. In several instances it is stated that a great number of vaccinations have been made during the past year and that a renewed interest in the subject has been recently observed. But from a good many towns comes a different report. The following are instances:—

Ayer.—"The children are well protected by vaccination. One-third at least of the adults have not been vaccinated since childhood."

Athol.—"No efforts have as yet been made by the town to secure complete vaccination. In consequence of the Holyoke epidemic there has been attention given to the subject on the part of many individuals."

Beverly.—"People are not protected as they should be."

Charlestown.—"There have been many unvaccinated children attending school." Our correspondent has induced the health authorities to make better provisions for gratuitous vaccination.

Colrain.—"People are not very well protected. There is a criminal indifference to the subject."

Cheshire.—"There has been no general vaccination of the town for the last ten or fourteen years, and it contains a large Irish population unvaccinated."

Chicopee.—"During the prevalence of small-pox in the adjacent town of Holyoke last winter, our town authorities took measures to have a thorough vaccination throughout the town and neighborhood; and we had the satisfaction of completely heading off the disease. I found that about twenty per cent. of my re-vaccinations, where there were good scars, showed perfect or nearly perfect vaccine pustules."

Essex.—"I have reason to believe it is too much neglected in this town. I occasionally meet with persons sixteen years of age and upwards who have never been vaccinated."

Hudson.—"The French residents as a class object to vaccination."

Hopkinton.—"Vaccination has been much neglected and very many are unprotected."

Leverett.—"Vaccination neglected."

Nahant.—"There are numbers of babies in the Irish class that have not been vaccinated."

Newton Corner.—"Children are allowed to enter the public schools who have not been vaccinated."

Pembroke.—"Vaccination is very much neglected. There must be a good many unvaccinated children in our schools."

Prescott.—"I do not think the people are protected from small-pox by vaccination as fully as they ought to be. I think one-fourth of the people are not vaccinated."

Reading.—"Vaccination is not made a requisite for admission to the public schools."

Rowe.—"I regret to say that vaccination is greatly neglected. The law is palpably defective.

Stoneham.—"A certain proportion of the foreign population are careless about vaccination, and for these, in my opinion, some public provision should be made."

Topsfield.—"The vaccination of children is not attended to as early as it ought to be."

Worcester.—Our correspondent, as city physician, has had to deal with several outbreaks of small-pox, and has dealt with them successfully. He is of opinion that the laws of the State with regard to both vaccination and small-pox are in need of revision. A great many foreigners (particularly French Canadians,) and young children are unvaccinated.

There are two ways in which the people may be protected from small-pox in the future, neither completely effectual, but each supplementing the other, and both combined rendering any community proof against an epidemic of this disease.

The first of course is vaccination, and the second, such isolation of the cases which do occur as may make the extension of the disease impossible. The first invests the human body with an armor which may hardly be penetrated by this subtle poison; the second destroys the poison itself.

Every community should, for the general safety, have ample power given to its health authorities to use both these methods at their discretion, and with perfect freedom.

Vaccination needs no defence from us. Nothing, however beneficent, can escape the criticism of the times in which we live. But this criticism of vaccination, often passionate and violent, relates chiefly to points which, however interesting they may be, leave the main question unaffected. Let any one read the history of the ravages of small-pox before Jenner's discovery, and compare it with the mortality of Massachusetts from this cause in the present generation, and ask himself the reason for this change. There can be but one answer.

We may speculate about the possibility of the potency of vaccine being exhausted in the human family, we may be surprised to find that people with good vaccine scars sometimes have small-pox, we may dispute as much as we please about the average period when re-vaccination may be considered a prudent safeguard, we may even conjecture (what no man has proved), that other diseases than that of the cow may be communicated by humanized vaccine, we may turn the vaccination question with ingenious skill, so that its many facets shall reflect a multitude of curious lights, and after all we find that we rest in a security against this most horrid pestilence unknown to former generations. The disease is the same now as then, for we see its effects among barbarous tribes, but because Dr. Jenner lived and made the greatest of all discoveries in preventive medicine, we are almost completely safe.

The present law of the State concerning vaccination gives the boards of health all needed power, except that it allows two years for the vaccination of children. It would have been better to require it in the first six months. There seems to be no reason why four per cent. of the whole living population should be legally permitted to furnish food for the pestilence. It may be said of *primary* vaccination that it is free from danger, and vaccination in the first few months of life has been proved to be safe by an experience of millions of cases in every civilized country.

But the great defect in our law concerning small-pox may be found in a single section, and is expressed in two lines of prohibition. Chapter 26, General Statutes of Massachusetts provides that persons affected with *diseases dangerous to public health* may, if in the judgment of the health authorities it be needful, be removed to hospitals specially prepared for their use, or be so guarded in their own dwellings that the public may be safe from contagion.

Section 51 of the same chapter then provides that these laws for the isolation of persons affected with diseases liable to spread by contagion, "*shall not apply to small-pox.*"

This prohibition has cost the State a good many lives during the past year, has interrupted great industrial interests, and has brought a heavy bill of expense upon the cities and towns whose health authorities were so restricted. For we deem it certain that the epidemic which has existed in Holyoke and Lowell, might have been extinguished at its very outbreak by the separation of the sick from the well.

As the law now stands there is no clear and definite authority given to Boards of Health to prevent a person sick with small pox from scattering the poison in all directions. His house may be freely visited, no danger-flags can be legally set up, and when able to walk about, with the scabs containing the concentrated virus still adherent to his skin or his clothing, he may go where he likes.

There can be no doubt that if this 51st section were repealed and the Boards of Health of cities and towns thus empowered to deal with small-pox as with cholera or yellow fever, such authority would not be harshly or unjustly used. In by far the greater number of places and with the great majority of patients, removal to a small-pox hospital would not be necessary. Among reasonable and trustworthy people such regulations could be made in their own homes as would secure the required isolation. But we have in our cities and great manufacturing towns a class of irresponsible, ignorant and reckless persons who can only be controlled by law. Such persons should be removed from the crowded dwellings in which they live when the public safety demands it.

As regards their destructive effects small-pox and common fire need similar restrictions. Let us endeavor to make the people small-pox-proof as we make buildings fire-proof, but let us not neglect the means of isolation and extinction.

HEALTH OF TOWNS.

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HEALTH OF TOWNS.

Under this head are arranged extracts from letters of our medical correspondents in Massachusetts giving information concerning subjects not otherwise specially treated in this Report. They include such facts and opinions concerning typhoid fever, and poisoning by lead, as have been sent to us since the publication of the Report of 1871, together with some interesting speculations concerning the probable causes of disease which will point the way to special investigations in the future. Many valuable letters concerning "consumption—its causes and prevention," and also concerning the "food of the people," have been received, but their publication is for the present reserved. The latter subject would have been considered in the Report of the present year but for the duties which have devolved upon the Secretary in connection with the Act of April 8, 1871, relating to "slaughtering and noxious and offensive trades."

Acton.—"Since certain ponds have been filled in with soil and have lost their influence as 'centres of deadly miasm' during the summer, the town is believed to be preëminently healthy."

Attleboro'.—"Typhoid fever and dysentery prevail from August to December; but both diseases are seldom rife the same season. Last autumn (1870) typhoid was wide-spread and many cases were of a grave character, complicated with abdominal hemorrhage and pneumonia. Although the fever was confined to certain localities, and in some instances attacked three or more individuals in the same house, it was impossible to discover any direct source of contamination. The families were nearly all in good circumstances, living in clean, well-kept houses, with no obvious source of impurity in food, drink or air. Wells were isolated from privies and drains, and careful search from cellar to roof disclosed no focus of disease. The season was extremely dry, the surface parched, and the wells low or exhausted. The tracts where the fever most prevailed were lower than the contiguous neighborhood; and in the spring, the section was saturated with water, and the cellars remained wet for some time. The epidemic occurred at the period of lowest water-level. The district has a good exposure to sunlight and free circulation of air. The only deleterious condition common to the district was the low water."

Ayer.—Pulmonary affections are common. Pneumonia, which has been specially prevalent the past year, has been undoubtedly due to sudden changes of temperature, and to the unusual amount of rain instead of snow during the winter. There are more cases of consumption here than in adjoining towns, attributable rather to great neglect of hygienic laws, especially of ventilation, than to any topographical peculiarities of the town. Proportionally, more cases of phthisis occur among the foreign population, where the ignorance concerning the laws of health is greatest. During and after the hot season of 1870, while the "mill-pond" south of the village was nearly dry and contained an exposed mass of decaying vegetable matter, and while a majority of the wells of the town were dry, an epidemic of typhoid fever occurred, the first in many years. Our correspondent deems this annual condition of stagnation and vegetable decay in the ponds a prolific source of disease, and especially of typhoid fever.

Amherst.—Typhoid fever has been especially prevalent, determined by moisture of soil in some parts of the town and defective drainage, which in part at least could be easily remedied. The air of the town is pure and its situation is exposed.

Boston.—The causes of preventable disease specially described in our report of last year (pp. 55–62 and 350–368), remain in full force. They exist to-day in Boston as the causes of preventable fire existed in Chicago before the late disaster—unheeded by the mass of the people intent on their daily business, and suffered to remain by those whose immediate duty it is to remove them. The streets and alleys and vaults and tenement houses are as dirty as ever. Unsound provisions are as freely sold. Great tracts of undrained and undrainable land are being built up, to be raised at a future day at enormous cost, but meanwhile exposing their occupants to dangers from which they should be shielded by public authority. We have been as free from destructive epidemics during the past year as was the city of Buenos Ayres for many years before the destroyer came. But we have fostered those elements on which the seeds of death will thrive whenever they fall among us. In every part of old Boston there are foul places, unseen by the passer-by, but perfectly well known to physicians, ready to nourish a pestilence, and to scatter it in every direction among those who live in seeming security. No man can protect himself and his family against such danger. It must be done by public authority and for the common good.

The present condition of law in Boston on these special questions relating to the maintenance of public health and the prevention of disease is perhaps more unsatisfactory than ever before, and yet there are indications, to which we will presently refer, which point beyond doubt to such awakening of public interest in the subject as will finally lead to reform.

The tenement-house law of 1868, chapter 281, General Statutes, whose execution was vested exclusively in the Board of Health of the city of Boston, was repealed by the last legislature.

During the three years of its existence no effort was made to enforce it, and our tenement houses went from bad to worse. The law was based upon one which has worked well in the city of New York, and whose effect may be seen in thousands of clean, orderly, well-lighted and ventilated tenement houses, provided with good privies connected with the sewers, with fire-escapes, and with water. In the one city the law was executed, and under extraordinary difficulties; in the other, no attempt was made to execute it.

Our tenement-house law was repealed on the passage of an Act, chapter 280, General Statutes 1871, which is known as the "building law." Many of the provisions of the old tenement-house law are retained in this very elaborate and complicated statute, but their execution must still be *at the instance of the City Board of Health*, and there is therefore no more to hope from it in this regard than from its predecessor.

The remedy for this state of affairs has been brought prominently before the city council during the past year, and has been warmly recommended by the present mayor in his inaugural address. It consists in a transfer of all the authority of a Board of Health from the Board of Aldermen to an independent board of five or more persons not members of the city councils, and holding office for a term of years. From such a board, including as has been proposed, two or more physicians and a lawyer (and we would also add, a civil engineer), removed by the tenure of their position as far as possible from political influences, the best results might be expected.

It has been often stated in the discussions of this contemplated change of authority that it is impossible for members of the Board of Aldermen to give the time needful for the discharge of such responsible duties in connection with public health as now legally belong to them, in addition to the weighty questions of every kind which constantly press for a decision. The aldermen of the city are not chosen with any regard for their fitness to comprehend sanitary questions, and although they may and do command respect for their faithful and gratuitous performance of very onerous labor, it cannot be wondered at that, as health-guardians of a great city like Boston, they fail. As the city increases their inadequacy to meet the demand must constantly become more conspicuous, and it will also inevitably entail a great and needless burden of cost upon our successors. The same wise forecast which leads our commercial interests to widen streets and make broad avenues for the business of the future, should lead us, through the teachings of Franklin's political economy, to provide for the preservation of human life and human health; for these are as truly wealth as are cotton or iron.

The time has surely passed for limiting the health duties of the city of Boston to the abatement of petty and isolated nuisances, which have simply become intolerable. Our commercial, as well as our physical and moral interests require us to take a broader view of the subject—to prevent the formation of causes of disease and of public discomfort,—to establish a system for the immediate removal of all material of whatever kind liable to suffer decay,—to establish plans of drainage adequate for our whole territory and harmonious in all their parts, and to prevent the occupation of lands whose complete drainage is not already provided for,—to seize and confiscate all provisions offered for sale which may be unfit for food,—to see to it that the occupants of our tenement-houses are helped in those essentials to health (air, water and sunlight) in which they are powerless to help themselves,—to open our blind alleys and narrow courts, and thus break up our nurseries of infantile cholera and intestinal disorder,—to purge and purify our "Institute avenues" and all similar plague spots, and to prevent their formation in the future.

All this and much more can be done by a well-constituted Boston Board of Health, with the influence of all citizens who wish for reform supporting their efforts and strengthening their hands.

The death-rate of Boston for 1871, based on the census of 1870, was 23.50 per thousand. This includes 518 deaths from cholera infantum.

Becket.—Bilious and typhoid fevers have been prevalent.

Belchertown.—"Inflammatory rheumatism more prevalent in the spring of 1871 than at any time during the past sixteen years." No special cause assignable. "We are on a hill, freely exposed to winds from all directions; soil, naturally damp, pervious to water, but springy; sunlight, free."

Berkley.—"A mild form of diphtheria has prevailed the last eight or ten years," attributed to no distinct local influences.

Brimfield.—"This township is mostly situated on elevated land, the subsoil of which is clayey and retentive of moisture; but little attention is paid to drainage. The standard of health is fully equal and probably superior to that of the surrounding towns." Our correspondent reiterates his observation of last year that "the loathsome emanations from pig-sties, sink-drains and privies are the cause of a very respectable proportion of the acute diseases" which occur under his observation.

Canton.—"During the summer and autumn months of 1870, we had an epidemic of fevers,—a few typhoid, others varied by some constitutional peculiarity. The cause was the opening of a new race-way at one of the mills; but since the removal of the displaced earth, the disease has subsided. The soil of the town is sandy loam; dry, not exposed to any foul air, and sunlight is abundant."

Clinton.—"The only diseases which can be said to be prevalent are scarlet fever and cholera among children. A large number of the deaths are from these diseases. They occur chiefly among the foreign population who work in our factories, and the deaths are, in my opinion, largely increased by overcrowding, filth and neglect.

"This is a river town, with interval lands rising to hills, with some sandy plains. I think there are more deaths in the valleys, in proportion to the number of the inhabitants.

"Sunlight, abundant. Soil is pervious in some parts, impervious in others. Drainage about the factories good. Town not particularly exposed to wind.

"There are situated on Grove Street, Clinton, in a space of twenty rods, eighteen tenement houses and one large boarding-house, belonging to the 'Lancaster Mills' corporation. In August, 1869, there were six cases of well-marked typhoid fever, all severe, and one terminating fatally, in this street. The fact that there were so many cases in so small a locality, the rest of the town being free from the disease, led me to suppose there might be a local origin.

"On examination, I found that the sewage of these houses was emptied into a ravine at the end of the street, and was there spread out upon a little plat of ground of perhaps a quarter of an acre in extent, where it remained on the surface, exhaling an offensive odor which the prevailing west winds carried through the street, contaminating the air to a sensible degree. I immediately notified the agent of the corporation, who caused the sewer to be continued to a distance from the houses, to a brook in the ravine, and not another case occurred after the extension of the sewer.

"I have no doubt that these cases of typhoid fever were produced by the putrid sink water before mentioned. One case proves nothing, but I offer this as one fact, to add to the general stock of information upon the subject of the causes of typhoid fever.

"My attention has never been called to the height of subsoil water."

"In August and September of 1870, an epidemic of lead disease appeared among the operatives of the Lancaster Mills in Clinton. The Lancaster Mills manufacture the "Lancaster ginghams," and employ about one thousand operatives. Their tenements are supplied with water for domestic purposes from the Nashua River; it is forced into a reservoir on an eminence through iron pipes, and thence distributed to the houses by iron pipes, and to the rooms in each house by lead pipes. During an experience of twenty-five years, no lead disease was known in these tenements until August 7, 1870. From that time until September 8th, fourteen cases occurred, presenting the characteristic symptoms. I now notified the superintendent that I was afraid he would be obliged to remove all the lead pipes, as new cases were appearing every day or two. On investigation I found that in several instances only a few feet of lead pipe was in use, and in some none at all, so that the fault could not be in the lead pipe. It then occurred to me that the sufferers were all Germans, and that the disease might be caused by drinking beer from leaden or pewter vessels or drawn through leaden faucets. But on examination I found that they all used glass drinking vessels, and that two of the patients never drank beer of any kind; and just at this time two Scotchmen were attacked. It was evident that lead was the cause of the disease, but from what source was it derived? I could find no article of food, no condiment that was in general use, but still the cases increased, and at length appeared among native-born operatives. Upon looking over the cases it was noticed that the sufferers were all weavers, and on further interrogation, "what colors they were weaving?"—I found invariably the answer was, "orange and blue." On examining the shuttles in the looms standing idle, an orange-colored dust was found, which on analysis by the chemist of the company was found to be chromate of lead, and all the weavers said they had never known so much dust in the shuttles as during the last few weeks while using the orange-colored yarn. Here was something tangible. The yarn is dyed by dipping it in a solution of acetate of lead, then in a solution of bichromate of potassa; the result is (with further manipulation which it is not necessary to mention here), a chromate of lead of a fine orange tint. The shuttle is threaded by drawing the thread through the eye of the shuttle by suction of the mouth.

"Immediately hooks were furnished to all the weavers to draw in their threads, and they were forbidden to "suck in" the thread. The orange yarn was found to be loaded with a superabundance of chromate of lead, owing to a faulty method of dyeing; this was rectified, and the disease very soon disappeared, but not till three men had had a second attack, and one poor fellow, who was one of the first attacked, was seized with convulsions (lead encephalopathy), of which he died on the third day.

"The obscurity in these cases was not in the diagnosis but in the source of the poison. It took six weeks to find this out, and in the investigation I was much assisted by the superintendent of the mills. In all, I had twenty-two cases in my own practice, and I heard of several in the care of other physicians.

"One peculiarity was the fact that relief to the pain did not follow purgation except in a few cases, and in some of the cases there was no constipation.

"In regard to the general question of lead colic or lead disease, caused by water passing through lead pipes, I would say that in my opinion nineteen-twentieths of the houses in Clinton are supplied with water by means of lead pipe; of these, perhaps 150 families are supplied from the Nashua River, the water being pumped into a reservoir and distributed by lead pipes as before mentioned; the remainder of the town is supplied from wells, except a few families who are supplied from a spring through lead pipe. I have never known of a case of lead disease in town where the water was pure soft water or river water, but have had several cases in which the water was hard. In one section called 'Burdett Hill,' I have had seven cases (I mean seven families) that were made ill by using water passing through lead pipe. In one case three families in succession were made sick from one well, each recovering on ceasing to use the water. This water was very hard, containing carbonic acid, chloride of sodium and sulphate and sulphuret of iron.

"In my experience with lead disease, I have found these the most marked symptoms,—pain, constipation, a yellowish complexion, not affecting the eyes nor staining the shirt, nor coloring the urine as in ordinary jaundice, and (the most constant and certain) the blue or slatish-colored line on the gums. This line is confined to that portion of the gums which overlaps a tooth; and moreover it is very slight in persons who habitually use the tooth-brush, and very marked in those who have accumulations of 'tartar,' so called; so that, in examining for this blue line it is important to examine all the teeth, as one will often find cases in which the gums of the incisors are entirely free, not colored, while the molars which, for obvious reasons, do not receive as much attention from the tooth-brush, will be decidedly discolored."

Prescott.—"A disease similar in character to whooping cough and influenza prevailed during the winter and spring of 1871 in the town of Greenwich mostly, though occurring in Prescott to some extent, and with occasional cases in New Salem and Shutesbury. It has seemed to be contagious, like both the diseases alluded to, running through whole families and lasting for several weeks. A portion of the time febrile symptoms would be present, and the cough would continue after they had subsided. The cough was peculiar, resembling whooping cough very much, being spasmodic, and in many cases so severe that the only relief they could obtain was by being carried into the open air, even if it were in the night. The breath would be expired continuously, without ability to inspire until the stimulus of cold and pure air was afforded. This seemed like whooping cough; but there was a negative element,—a great many people, and some of them sixty to seventy years of age, have had the same, although they had had whooping cough while young.

"In treatment the disease was very obstinate, all ordinary expectorants and cough-mixtures seeming to do but little good. I can hardly account for this violent form of influenza, for I have called the disease influenza, with spasmodic cough; it appeared as an epidemic and disappeared in a few months.

"The soil of this region is mostly a sandy loam with clay subsoil, the depth of the sand being considerable. The land is mostly level or undulating, being in the valley of one branch of Swift River. Exposure to sunlight and wind not exceptional."

Carver.—"The diseases most prevalent in this locality are typhoid fever, phthisis and diphtheria. There are a great number of ponds in the town and many of them have no outlets. In spring, summer and autumn there are dense fogs from these ponds at night, which hang over the valleys and low grounds. In the heat of summer, bowel complaints, especially dysentery, are very prevalent. The houses where typhoid fever has occurred most frequently are situated near the ponds and on the low grounds."

Charlestown.—No diseases prevail which can be attributed to special local influences. Typhoid fever is believed to depend on the presence of decaying vegetable matter, to dryness of the season, and to the use of hard water; it has been less prevalent since the use of the Mystic water. Uncovered vaults, bad drainage and filth in general are assigned as causes of disease; and cases are alluded to in which typhoid fever disappeared from a neighborhood on the removal of some such noxious condition. "Cases of typhoid do not occur generally on the high land, but around the borders of the city and particularly on the made land." Certain manufactories are cited as exercising a deleterious influence on public health through the noxious vapors which contaminate the air, and their contemplated removal, it is believed, will result in decided benefit.

Cheshire.—Catarrhal fever and pneumonia prevalent; "due, no doubt, to sudden changes in the weather, with variations from wet and warm days to sudden cold snaps." The town is well located as regards soil, air and sunlight.

Colrain.—Enteric and gastro-enteric diseases have prevailed here the past year. Our correspondent thinks they may have been caused in no small degree by the free use of "hard cider." No special local peculiarities of the soil or atmosphere. In the winter of 1870–71, the town was visited by an epidemic of exanthematous disease resembling scarlet fever but having also some of the characters of roseola. Its symptoms were "sore throat, headache, fever and great languor, followed after a variable time by an eruption very much like scarlet fever." It was most frequent with young children and was insignificant in its course and results.

Conway.—Lung diseases and diseases of the nervous system prevail. "The prevalence of pneumonia and consumption is not, in my opinion, so much to be attributed to atmospheric causes and moisture as to carelessness in dressing the young (especially females), and the want of proper ventilation in sleeping-rooms."

Chicopee.—Diseases of the respiratory organs,—bronchitis, tonsillitis, pneumonia and phthisis,—prevail. The situation of the village is low, at the confluence of two rivers, and fogs are very prevalent during the spring and autumn. During the summer months, cholera infantum is epidemic; confined to children of foreign parentage, and very fatal. Medical treatment is found unavailing in the presence of ignorance and miserable surroundings. Improvements in hygiene led on by the manufacturing corporations are becoming manifest.

Danvers.—"We are having a malignant form of scarlet fever at Danvers Port, proving fatal, with ulcerated throats, assuming a gangrenous form. The port is bounded easterly by salt water, and the land has a clay bottom with exceedingly damp surface the whole warm season. Soil, wet and impervious; situation, low; air, damp with a good deal of east wind."

Dedham.—Phthisis and rheumatic fever are common. "Forty years ago, there were more cases of phthisis in West Dedham, where the land is dry and so high that the 'Boston' light-house can be seen. Of late years there has been more of the disease in Dedham, near the banks of Charles river."

Dudley.—Lung diseases prevail. Soil moist, and situation high and exposed to winds. "People keep rather shaded."

Eastham.—"Typhoid fever, and, for the last two years, jaundice, have prevailed. The soil is sandy and dry, low, and generally level. The town is exposed to winds from all points, and is not much shaded."

Easthampton.—"A mild form of scarlatina has been extremely prevalent; in no case of a malignant type, but followed in many instances by sequelæ. From 1853 to 1860, a mild type of typhoid prevailed through Hampshire County; the disease has gradually disappeared, however, and is now quite rare. No satisfactory cause could be assigned for its prevalence, and no change in the sanitary condition of the people has occurred to explain its subsidence." The town has no marked peculiarities of location or exposure; its soil is dry and very pervious.

Everett.—"This town (formerly a part of Malden) slopes toward the south and south-west. The soil is in some parts porous, and in others clayey. Water is good on the uplands, but is impregnated with lime. The town is exposed to bleak east winds, with fogs near the marshes." Pulmonary diseases, rheumatism and typhoid fever are prevalent, depending for their causes on sudden changes of temperature, and on the ill-ventilation of dwelling-houses. "A few years ago, in one locality, there was a small pond, and the water became stagnant, with a green scum. There were many cases of inflammatory diarrhœa of a typhoid type, and fatal. I am clear in my opinion that there was a miasm from that source."

Falmouth.—Our correspondent gives the detailed history of twelve cases of typhoid fever, occurring within a small district, and originating in "a very old house, the rooms of which were small and ill-ventilated, and inhabited by a large family, whose habits were very uncleanly. The slops and refuse were thrown upon the ground a short distance in the rear of the house. The odor from the rooms was so offensive that it was with the greatest difficulty that watchers could be procured to stay with the patients. Two fatal cases occurred in this family. It seems that the want of proper ventilation and the extreme uncleanliness, if not the sole cause of the disease in the first instance, certainly exercised a powerful influence, the only deaths occurring under these bad hygienic conditions."

Fairhaven.—"Influenza has prevailed very extensively since January 1871. Rheumatism and neuralgia occur frequently, depending on sudden changes of temperature, and some peculiar condition of the atmosphere that we know little or nothing about. Near the seashore the soil is pervious to water and is dry; a short distance from the shore, the soil in most parts of the town is impervious to water. The town is flat and low; underlying it to a great extent is gneiss rock that crops out in many localities. Exposure to south-west winds that come from Long Island Sound. Village much shaded by trees, but the region in general is well exposed to sunlight."

Fitchburg.—Our correspondent calls attention to the very imperfect manner in which some of the work-shops and factories of this town are ventilated. "In one of these the ventilation is shockingly bad. Some 250 to 300 men work in one room, 600 feet long, of a one-story building, with flat roof, and with ventilation by side windows only. I am confident such a condition is a source of defective health, if not of actual disease, to many of the operatives in that shop. The air is loaded with greasy odors, and in a cold day in winter or hot day in summer, the atmosphere is very bad. I do not know how to arouse the corporations to apply an easy remedy.

Perhaps a pestilent and fatal fever among the men might stir them to adopt better and more scientific ventilation."

Gloucester.—The air is rendered foul by the practice of dressing the land in early spring with decaying fish. How far this is detrimental to health, our correspondent thinks not yet proven. Tapeworm is said to be specially prevalent.

Granby.—"This is a remarkably healthy town. The houses are generally exposed to sunlight; the soil is dry; the air is good, without special exposure from any quarter."

Hadley.—"Soil, rather dry, generally pervious. Situation, high. North-west and south-west winds prevail. Fogs frequently prevail in the latter part of summer, arising from the Connecticut River. The prevalent disease is a condition secondary to cerebro-spinal meningitis; it is observed in connection with any condition of unusual debility, and sometimes constitutes the termination of diphtheria, and the diseases incident to childhood and old age.'

Halifax.—"A part of the town is sandy; the rest is flat and through it runs the Winnatuxet river, which empties into the Taunton River. Along the course of this stream are low meadows that are often overflowed in summer and autumn; as this overflow dries up, a very offensive deposit is left, and owing to the low and flat location many of the cellars are wet. In this part of the town we sometimes have typhoid fever. Some years ago, this fever prevailed as an epidemic along the whole length of the section overflowed, and nowhere else. Dysentery is also more common in this part, and so also is scrofula and consumption. It is often remarked that the inhabitants of this locality are not so robust and look paler and are less energetic than those elsewhere."

Hanson.—"In one locality, typhoid fever has been unusually prevalent and severe. The region is near a pond and marsh, and is low and wet."

Huntington.—Typhoid fever and phthisis prevail. Soil, moist; location, low without proper drainage. "The people are becoming more alive to the importance of hygienic measures."

Hopkinton.—"Consumption, typhoid fever, rheumatism, erysipelas and abscesses (especially whitlows) have occurred frequently during the past few years. Hopkinton is very high and exposed to cold winds. The land is springy, and the highest hills seem to have fully as much moisture as the low lands. Underdraining would be of some service. One of our streets is too much shaded and has had an unusual share of sickness during the last thirty years, chiefly typhoid and bilious fevers."

Lanesboro'.—"Embraces a section of country called the valley of the upper Housatonic. It is thirteen hundred feet above the level of the sea. The valley is unsurpassed for fertility, having a soil that is never affected by drought, being rich loam underlaid by a clay subsoil. It is surrounded by a perfect amphitheatre of hills. Our location is remarkably healthy; the deaths for ten years by consumption will not average 1.5 yearly for every 1,000 inhabitants. There are no prevalent diseases."

Leverett.—"Typhoid fever and pulmonary consumption are the most common diseases and the most fatal. Typhoid is the disease of the autumnal months. Phthisis destroys at least fifteen per cent of the people over twenty years of age." There are no noteworthy local peculiarities.

Leyden.—"Pulmonary complaints are very common; caused by exposures, atmospheric changes and neglect of hygienic principles. The soil of the town is generally dry and pervious to water; its situation is high."

Lincoln.—"A peculiar form of influenza, producing lameness similar to rheumatism, prevailed in March and April, 1871." The region is an agricultural one, with variable surface, plenty of sunlight and few damp localities.

Littleton.—"Consumption quite prevalent; in most cases due to hereditary tendency, and increased, I am convinced, by the frequent consanguineous marriages. Soil moist from annual overflow of Beaver Brook."

Longmeadow.—"No diseases specially prevalent. The situation of the town is high; soil, dry; there is no stagnant water; the air is pure."

Malden.—"No disease has been specially prevalent in our town during the last five years. At all times we are subject to the diseases common to a changeable New England climate. Of those citizens who are not wealthy the majority have the means to enjoy plenty of room in, as well as out of doors. They appreciate the importance of wholesome food, dry cellars, warm clothing, and pure air and water.

"It has become proverbial among visitors that 'everybody in Malden keeps a horse'—and it adds, no doubt, much to their health as well as happiness.

"For more than a year this town has enjoyed the use of water from Spot Pond, which has thus far proved a great luxury, and will no doubt be conducive to health. The street pipes are lined with cement. Many of the service pipes are galvanized iron, and their effects are less injurious now than when first laid. I have examined several pieces taken up from time to time, and have found them lined with iron rust and oxide of zinc. The longer they are subject to the action of the water the less zinc, and it probably will not be long before the pipe will be rendered useless by the oxidation of the iron."

Mattapoissett.—"In this community I see more ill effects from ill ventilation than from other causes. People will sleep in a seven by nine bed-room, with door and window closed, and with such a general fear of fresh air that I am surprised they continue as well as they appear."

Montague.—"Pneumonia prevailed quite extensively during the winter of 1870–71, and was quite fatal. I can only attribute it to sudden changes of the weather, and to want of care and of protection by proper clothing. The town is situated in the Connecticut Valley, rather low, with a dry, sandy, pervious soil."

Nahant.—"The chief source of trouble to health is the habit of people here in winter of closing up the houses and living in rooms overheated with air-tight stoves."

Newburyport.—"I think we have more deaths from phthisis than any other disease. The soil is dry, pervious to water, and so graded by nature that the drainage is perfect. Every rain washes the streets and gutters, and carries all the effete matter into the river. We are blessed with a clear, pure air, and, during the hot summer weather, the heat is tempered by the cool east winds."

Orleans.—Zymotic diseases frequent. The soil is dry and sandy, except near the numerous inlets of the sea, which encroach on the land, and which are bordered by low, marshy ground. When north and north-east winds blow, they are accompanied with a salt-water fog, not injurious to health.

Pittsfield.—"No disease has prevailed to any remarkable extent during the past year.

"All cases of typhoid fever that I have investigated are traceable to local and removable causes.

"Soil generally dry and gravelly, with a few patches of hard-pan. Land is elevated. Air pure. High winds from the north-west are prevalent.

"Parts of the town are much shaded with elms and maples.

"Typhoid fever has been less than usually prevalent the past season, and generally of a mild type, with very few deaths, and but few of the cases exceeding two weeks in duration. Several striking instances of *local cause* have come under my notice.

"In August, four cases and one death occurred among the French charcoal burners, who live high up on the side of the Taconic range of mountains. They occupy two log-houses, one perched on the steep side of the mountain, at a considerable elevation, commanding a very extended view to the east and south, and the other not quite so high, in a deep, dark gorge, between two summits. Each hut gives shelter to about sixteen men, women and children, who are crowded together like sardines in a box. The houses are internally clean, and are supplied with pure spring water.

"The first case of fever, a very virulent one, was a young girl living in the house on the open hill-side. She recovered, although for two weeks she seemed at the point of death. In seeking for a local cause, I found that, on the side of the house toward the mountain, the window-sills were at the level of the ground, the house being partially underground on that side. Close to the house on this side, coming within a few inches of the wall, was a large stagnant pool, formed by the trickling of a small spring. Into this pool most of the house slops were thrown, so that a filthy pool stood four feet above the level of the floor, and almost running into the windows. About the two doors, on the exposed side of the house, decaying vegetables and slops were thrown, but the spring from which drinking water was obtained, about three rods from the house, appeared not to be contaminated. The patient had not been away from home for more than a month previous to her illness, nor had she in any way been exposed to other than local agencies. Three weeks after she was attacked, three cases of fever appeared in the other house referred to, in the gorge. One died, the other two recovered. This house is wholly aboveground, but slops were thrown out about the doors. In the second story, which is directly under the roof, with the floor level with the eaves, eight men slept, the room being about 24 × 12 feet. Daily communication was had between the two houses, which are about half a mile apart. These houses are about five miles from the village of Pittsfield, and two miles from any other dwellings. Fever was not prevailing in the valley, and the cases appear to me valuable and suggestive ones in considering the causes of typhoid fever.

"Another set of cases occurred in September in a part of Pittsfield called Coltsville, four miles east of the village. The settlement consists of a dozen houses, lying in a narrow valley, along the banks of a rapid stream. For several years past, fever has prevailed there every summer, and the cause has been a puzzle. The stream is rapid, its bottom stony, and it also contains considerable chloride of lime from the paper-mill. This year there were five cases there, and two deaths. I visited the locality, in company with another member of the town Board of Health, and examined the houses where the cases existed. One of the houses where a fatal case occurred was supplied with drinking water from a well close to the edge of the piazza. The well was loosely covered with boards, and all the house slops were thrown out immediately around, so that they must of necessity trickle down the well, and every rain must wash down a considerable quantity of filth. In addition to this, a barnyard, four or five rods from the house, contained a very large pool of stagnant water, without any outlet, and covered with a thick layer of green slime. This pool, which is several rods in extent, has existed for several years. Persons driving past the house in the evening have complained of the offensive exhalations from this pool.

"Another house where a fatal case occurred this year, and another last year, is supplied with water from a very old well dug just at the edge of the barnyard so as to supply both the stock and the house. In cleaning it out this fall, pieces of rotten wood and a dead toad were found in it. In every other respect the premises were remarkably unobjectionable.

"The house adjoining this, in which another case occurred, was excessively filthy. We were satisfied, from our inspection, that the fever epidemics at Coltsville are the natural result of a neglect of local sanitary precautions.

"These are the only cases of typhoid fever which possess any special interest."

"To my report on typhoid fever, sent a few days ago, I wish to add the following figures :—

"Deaths in Pittsfield from all causes, from Jan. 1st to Dec. 14, 1871,	103
"Deaths from typhoid fever,	6

"I wish also to add that, in the last week of June, two fatal cases of dysentery occurred in one family, in children, of a very malignant type. The house was contiguous to a large tannery, and the children had been playing in a shed containing a large quantity of green hides, which, from the warm weather, were extremely offensive. This seemed to me a case of cause and effect."

Pembroke.—"There is one locality, along the margin of a small stream, where the land is low and damp and particularly subject to fogs, in which there are a comparatively large number of cases of 'hay fever.' I have never thought there were relatively more cases of phthisis here than elsewhere."

Plympton.—Rheumatism and scarlatina are the prevalent diseases, "owing to sudden changes of temperature, and from dry to wet. The soil in most of the localities where these diseases prevail is wet and impervious to water, and the air is loaded with dampness from low and swampy lands."

Quincy.—"During the past two years consumption has been more prevalent than at any other period in the ten years during which I have been in practice here. In the autumn of 1870 bowel complaints, frequently associated with bronchitis, prevailed to a great extent among the poorer classes, and frequently proved fatal. The soil where such diseases have prevailed has been low and damp, and air has been rendered foul by imperfect drainage and filth. Sunlight has had free access."

Rochester.—"Typhoid and scarlet fevers are frequent; but the cause cannot very rationally be accounted for. Our soil is dry and the atmosphere is generally good. We have but little marshy soil."

Southbridge.—A physician in Southbridge (not our correspondent appointed by the town), sends us the following interesting information concerning typhoid fever:—

"The causes of typhoid fever is a subject which, of course, has engaged the attention of every thoughtful and observing practitioner of middle age for many years of his life. I have no theories to obtrude upon the attention of the learned world nor criticisms to make upon the studies or reports of others. But many years of observation, confirmed by testimonies of our brethren, has led me to believe that this fell agent of disease and death has an origin that eludes not less than mystifies the observer, and I could wish the influence of the agency in question might be a matter of inquiry during the coming season; it is this, that a majority of cases of typhoid fever actually occur in *newly built houses*, or at least a very large proportion of the cases. At first sight this may challenge criticism, but close inquiry will induce respect for the statement. In sixteen of the reports from different towns from which your report of the last year is made up, the concurrence of these facts is either personally known to me or the circumstances stated in detail leave no doubt of the coincidence. For example, statements from Worcester, Somerville, Williamstown, Ashland, &c., correspond so exactly with a state of things occurringin my own observation in 1836 and in 1854, and are confirmed by so many repetitions as to lead me to look for typhoid fever as the attendant upon new growths of population in and around large towns and manufacturing villages, as often as a spirit of enterprise or unusual prosperity calls for increase of house accommodation. Pardon the details of '36 and '52 in this town. In 1836 the building of a large mill called for the erection of a new boarding-house of brick, which was constructed one hundred and fifty feet long and three stories high, on a dry, gravelly knoll, drained by a rapid brook which ran at its base. This house was filled with boarders, young and middle-aged, drawn from the farm-houses of the middling farming class. In August, typhoid fever broke out in the house and was a constant inmate for many months; the next year it reappeared and also the year following, but never since to so great an extent, although it now and then, as in all villages and houses, presents itself, but not in a virulent form.

"In 1852 the erection of another new mill made necessary another new boarding-house, which was erected (of wood, three stories in height) upon the opposite side of the river and upon similar soil, though not having the same facilities for drainage. The first year of its opening was followed by similar results, the occurrence of typhoid fever and dysentery among its inmates, prevailing to a serious extent and only abating with the appearance of frost. The number of cases I cannot give as I kept no notes; but I can aver that in each case the proportion of cases to the whole number of cases in the vicinity was three or four times as great.

"The year following, this disease made its appearance again in the form of typhoid dysentery, which was checked by sending each new case away from the house.

"These are only two of the many instances in which, in my observation, typhoid fever has followed the opening of the soil, so that I feel justified in directing attention to it as one of the exciting causes of a much dreaded disease. Observation has led me to question the causative force of decaying animal matter, as under the most favoring circumstances it has seemed to fail in producing decided results; as in sieges, when its influence would concur with other exciting causes; these eliminated, there seems no proof of its power in the direction of causing typhoid,—at least this was my experience through a protracted siege during the summer heat of the lower Mississippi. *Terrestrial emanations*, then, seem to me to exercise a stronger influence and to be worth more study by the profession as a cause of typhoid fever than they have received. The great influence these exert as a disturbing force, is more manifest in another of their phenomena not well recognized or understood by the profession, and that is their agency in the development of influenzas. During the winter, whenever the temperature rises to a degree sufficient to thaw the frozen earth, catarrhal fever reigns epidemic; if the ground is covered with snow, or the changes, however great, do not release the frost, this does not occur. This rule may not be without exception, but the rate of exception to occurrence is so small as to leave no doubt of the rule, as any one may demonstrate by noting or remembering the circumstances as they occur. This explains why invalid persons, confined to close and well-warmed rooms, enjoy no protection from the invasion of influenzas; a subtle *something* is released from the broken surface and disseminated through the atmosphere, and everybody 'takes cold.'"

Sheffield.—Rheumatic, typhoid and bilious fevers common. "The enteric fevers proceed from local causes, as bad water and foul air from privies. Bilious fevers and rheumatism are caused by stagnant water and dampness of the air. The Housatonic River runs the entire length of the town; it has a fall of only thirty feet, which makes a sluggish current and much stagnant water."

Shirley.—In an experience of thirty years, consumption appears to have been the most common disease in the village. The location is moderately elevated, with north-east and north-west exposure. Soil impervious; a meadow adjacent. "Most of the cellars are subject to standing water in the spring and after severe rains." Better drainage is suggested as an improvement.

Shrewsbury.—Diseases of the respiratory organs prevail. Consumption more fatal than usual; accounted for by "the unusually rapid atmospheric changes, and by prevailing easterly winds, without regard to diversities of soil, air and sunlight."

Somerset.—" Pulmonary and bilious complaints are common." The town is exposed to high, easterly winds and sudden changes. The soil is dry and the air is pure.

Somerville.—" In this city our population is rapidly increasing," and new houses are being extensively built; so there is less probability of sickness than in an old and densely populated place. Our population is made up, in great proportion, of the young and middle-aged. Our city is being well drained and fully supplied with pure Mystic water. Our people are adopting the best sanitary measures for the health and comfort of all in our school-houses and other public buildings."

Stoneham.—" The soil is, in general dry, sandy, with sections of marshy land in several parts of the town. The locality is high. The air is often rendered foul by emanations from factories, piggeries, privies, etc. As regards the latter, little has been done in the use of dry earth. The subject has several times been laid before members of the Board of Health, but no action has been taken. In my opinion, the emanations from piggeries and privies are more offensive and injurious than those from public works. Sunlight has free access in most localities, the exception being groups of tenement houses in the very centre of the town; these are very deficient in this respect."

Swampscott.—" Bronchial and lung diseases " prevalent. Situation exposed, with cold and damp easterly winds from the ocean.

Walpole.—" During the last winter and spring (1871) there were an unusual number of cases of pneumonia, and influenza might almost be said to have been universal. I am inclined to attribute the latter disease to exhalations from dead vegetable matter which was unusually exposed to sun and air by the absence of snow on the ground."

Webster.—Diseases of the respiratory organs most common; next, typhoid fever. The former are attributed to the heavy fogs which rise from the river. The soil is generally dry and pervious to water; the situation is low, but not marshy nor exposed to trying winds; the air is pure, and drainage is good.

West Newbury.—Rheumatism and diseases of the lungs prevalent. Soil, wet and impervious; exposure to east winds; some dwellings too much shaded.

West Springfield.—"Houses too much shaded, so that they are rendered damp." Cellars also are damp, their level being below that of river high-water, so that in spring they are flooded.

Williamstown.—Scarlatina prevalent. "Sufficient care is not taken to stamp out the disease; it spreads through infection rather than through contagion."

Wrentham.—Consumption and pneumonia are specially prevalent, dependent on no distinctive local conditions.

Woburn.—"There are no diseases *specially* prevalent in this town, unless they be diseases of the respiratory organs, or throat and lung diseases, both acute and chronic. In a population of eight thousand there were one hundred and forty deaths in 1870. Of these twenty-six were from consumption, nineteen were from cholera infantum, and only three from typhoid fever. Woburn seems to have been peculiarly exempt from typhoid during the past ten years.

"Dampness seems the cause of much of the lung and throat disease prevailing here, and operates in a variety of ways. The soil is wet. There is water in the cellars in many locations during the spring and fall. There are too many shade trees around dwellings. There is much overcrowding in tenements in low situations. The surface of the town is undulating,—hill and valley; the soil generally impervious to water, and full of springs in both high and low situations."

Upton.—"Consumption is the prevalent disease, due, in part, among females, to overwork on bonnets and hats. The soil is porous on the low lands, moist from springs on the uplands. The air is pure and the sunlight free."

AN ACT

ESTABLISHING THE STATE BOARD OF HEALTH.

[Chap. 420, Acts of 1869.]

AN ACT TO ESTABLISH A STATE BOARD OF HEALTH.

Be it enacted, &c , as follows:

SECTION 1. The governor, with the advice and consent of the council, shall appoint seven persons, who shall constitute the board of health and vital statistics. The persons so appointed shall hold their offices for seven years: *provided*, that the terms of office of the seven first appointed shall be so arranged that the term of one shall expire each year, and the vacancies so created, as well as all vacancies occurring otherwise, shall be filled by the governor, with the advice and consent of the council; but any one may be reappointed.

SECTION 2. The board shall take cognizance of the interests of health and life among the citizens of this Commonwealth. They shall make sanitary investigations and inquiries in respect to the people, the causes of disease, and especially of epidemics and the sources of mortality and the effects of localities, employments, conditions and circumstances, on the public health; and they shall gather such information in respect to those matters as they may deem proper, for diffusion among the people. They shall advise the government in regard to the location of any public institutions. They shall, in the month of January, make report to the legislature of their doings, investigations and discoveries during the year ending December thirty-first, with such suggestions as to legislative actions as they may deem necessary.

SECTION 3. The board shall meet at the state house once in three months, and as much oftener as they may deem expedient. No member except the secretary shall receive any compensation, but the actual personal expenses of any member while engaged in the duties of the board shall be allowed and paid.

SECTION 4. It shall be the duty of the board, and they are hereby instructed, to examine into and report what, in their best judgment, is the effect of the use of intoxicating liquor, as a beverage, upon the industry, prosperity, happiness, health and lives of the citizens of the state. Also, what additional legislation, if any, is necessary in the premises.

SECTION 5. The board shall elect a secretary, either from their own number or otherwise; but when elected he shall be a member of the board and their executive officer. He shall perform and superintend the work prescribed in this law and such other duties as the board may require. He shall receive from the treasury, in quarterly payments, an annual salary of twenty-five hundred dollars and his necessary travelling expenses incurred in the performance of official duties, after they have been audited by the board and approved by the governor and council, and all other necessary expenses arising in his office shall be paid out of the treasury in the same manner as those of the different departments of the government.

SECTION 6. This act shall take effect upon its passage.

Approved June 21, 1869.

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